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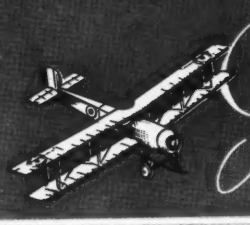

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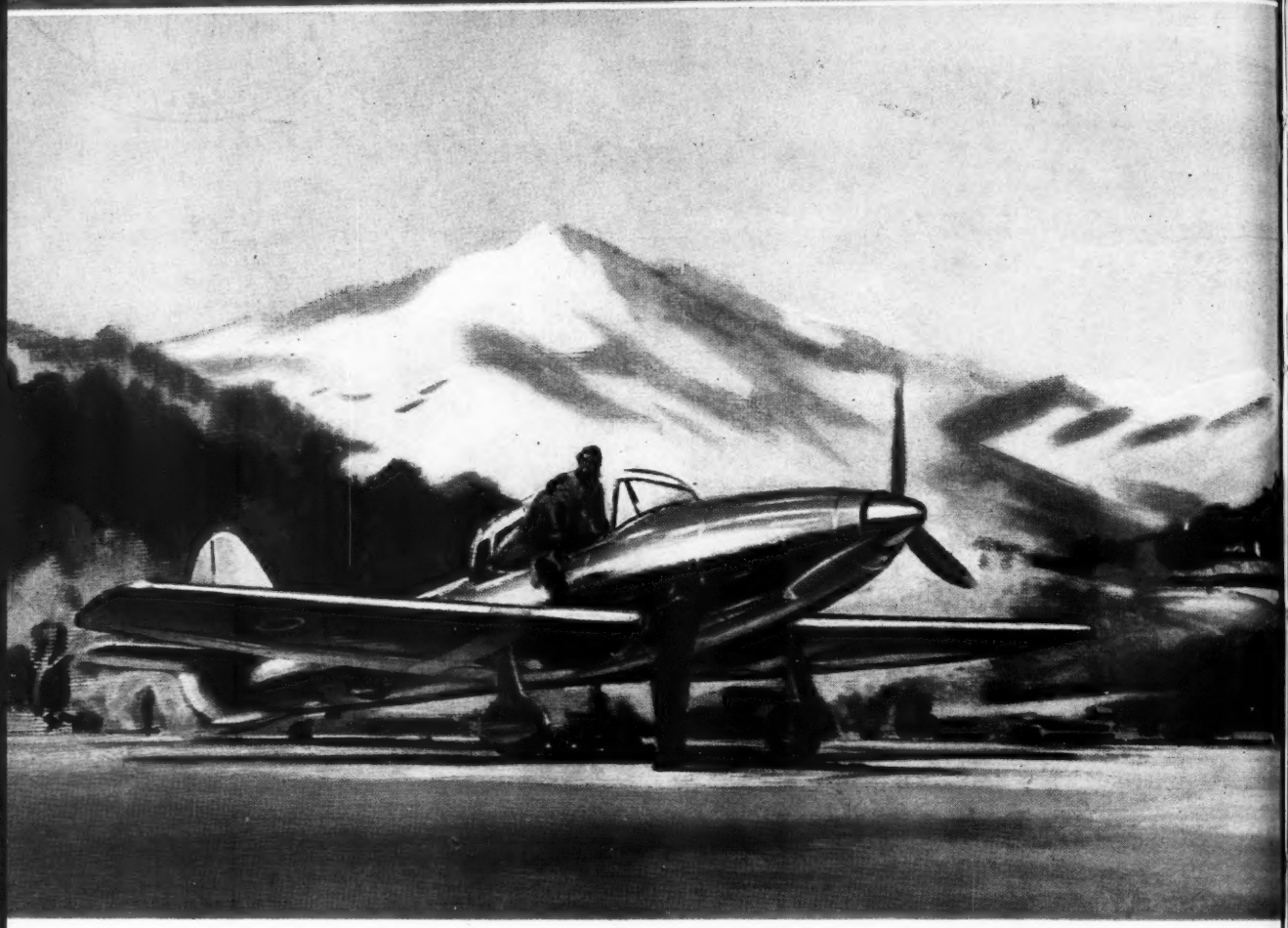

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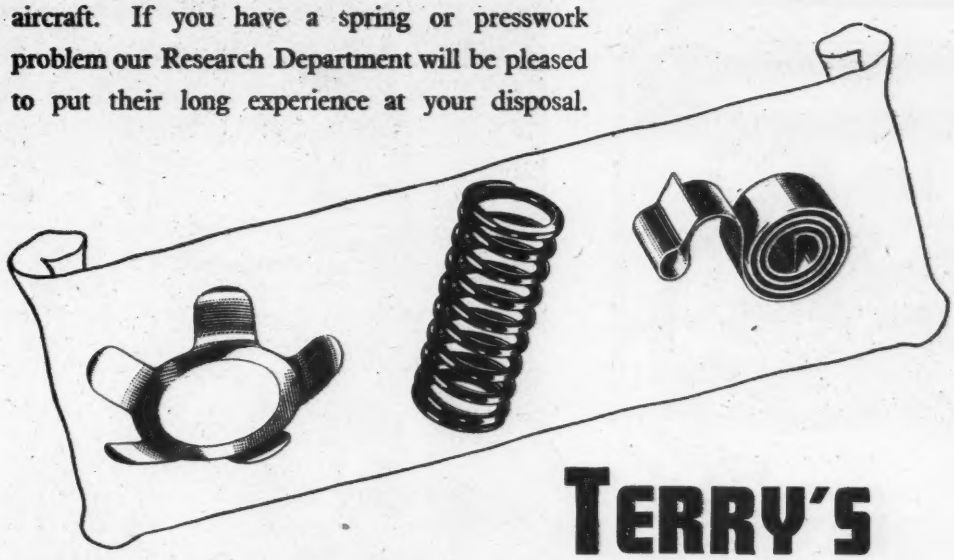

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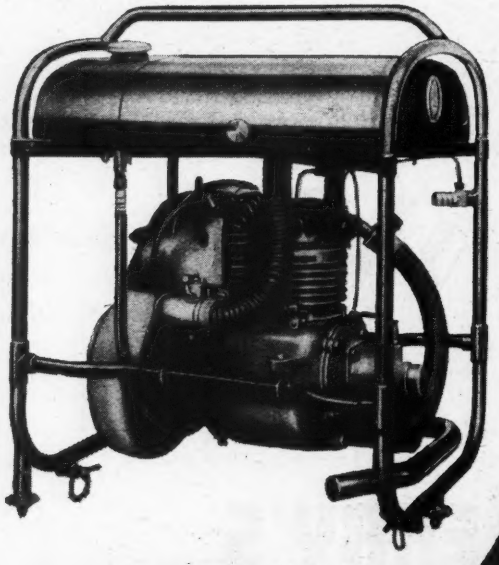

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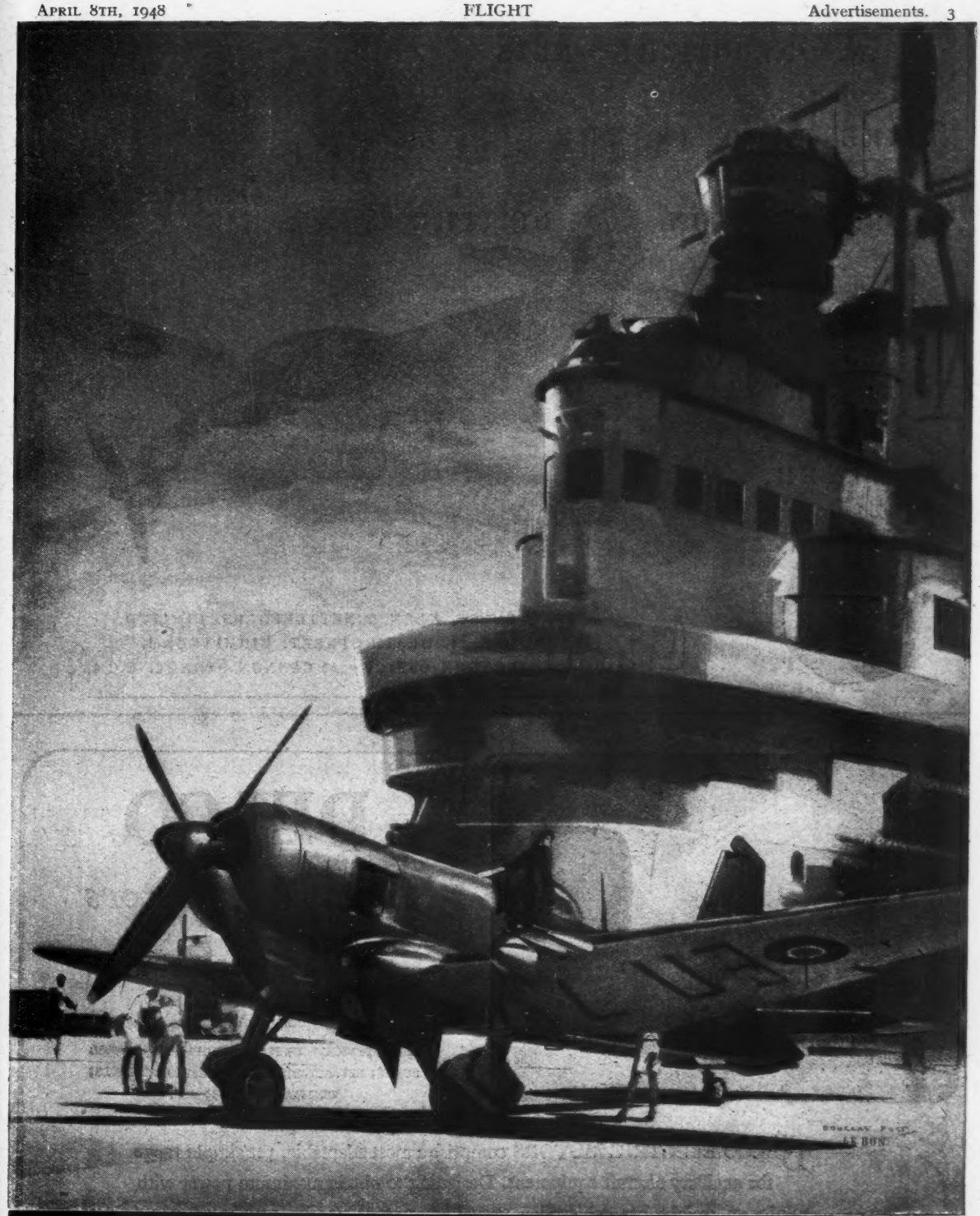

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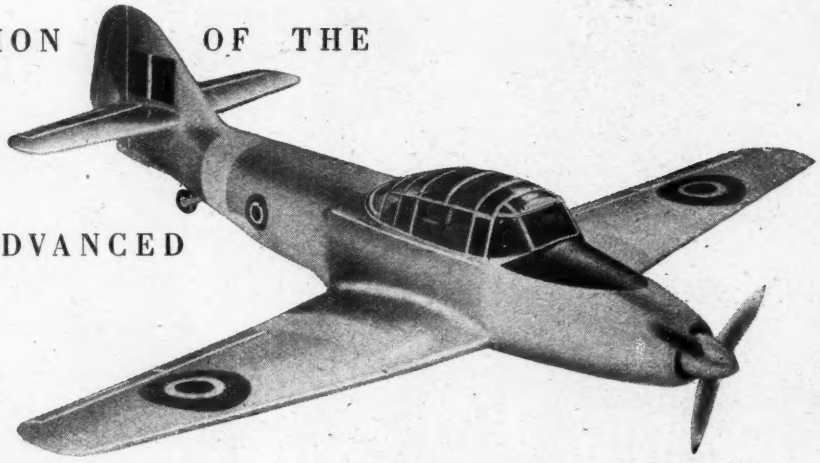

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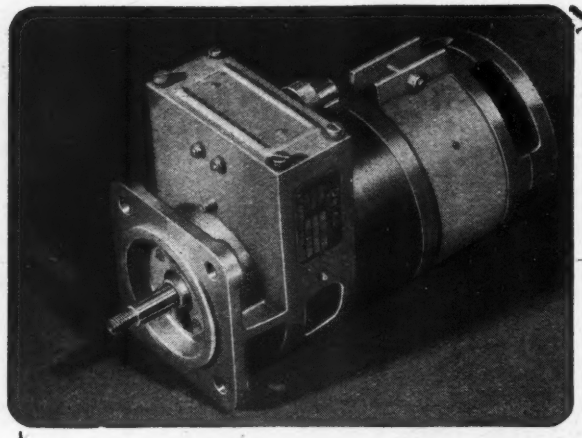

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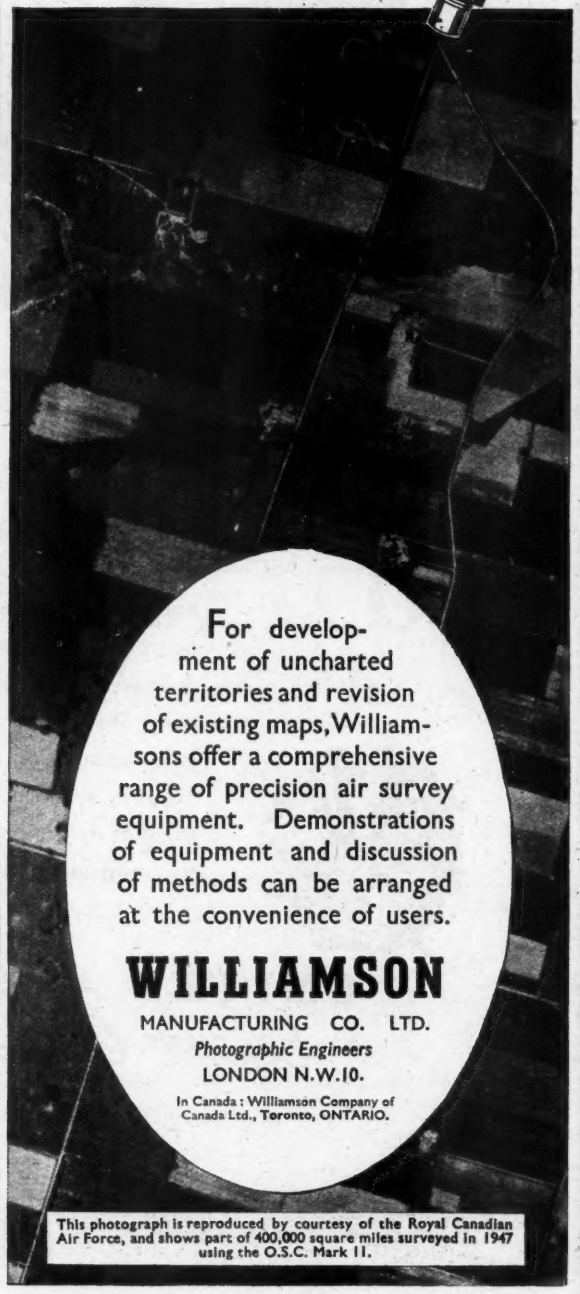

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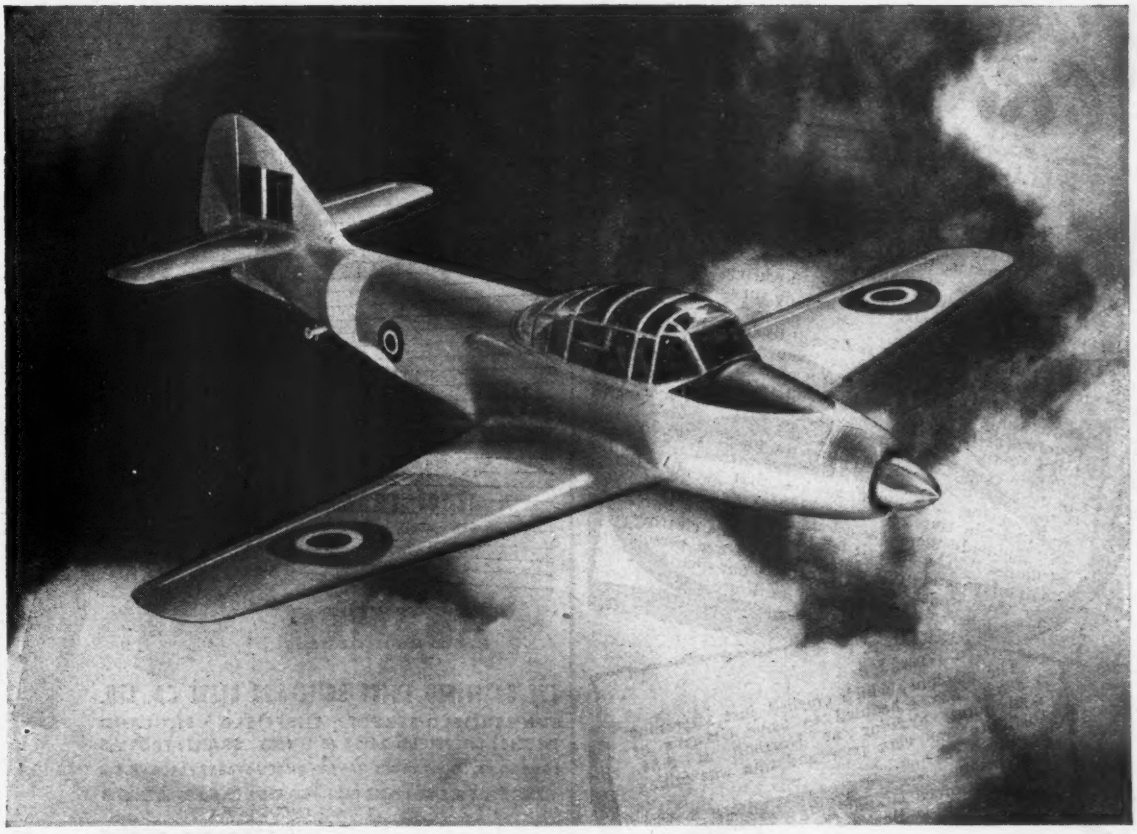

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*CRASH-FIRE!

16 KILLED IN PLANE CRASH NEAR PARIS

FROM OUR OWN CORRESPONDENT

PARIS, Tuesday.

Sixteen persons, including two Englishmen and three Americans, were killed to-night when . . . . plane from Brussels to Paris crashed when about to land at Le Bourget airfield. The only survivor was a Polish woman . . . .

Most of the victims were burned to death before rescue parties could get near them. The plane, ... with 12 passengers and a crew of five, was approaching the airfield when the accident occurred at La Patte d'Oie de Gonesse, about five miles to the north . . . .

There was poor visibility, and the plane is said to have struck a pylon. One eye-witness said: "The plane was flying so low that it almost touched the trees . . . .

"Suddenly there was a loud crash, then a burst of flames." The aircraft fell to earth in a clearing. Its fuselage and wings shattered. Three persons were thrown clear of the wreckage but died . . . .

The names of the British dead are . . . .

Scattered Wreckage

The machine, which crashed just after nine o'clock, was scheduled to leave Glasgow at 6.39 p.m., arriving at Northolt at 8.34. Visibility was very poor and rain was falling heavily.

According to . . . . it was making a forced landing at the . . . . when it crashed near Fine Bush-lane.

Fire engines, including fire tenders, from Uxbridge, Ruislip and Harrow, were called, but the aircraft did not catch fire.

Parts of it were thrown over an area of nearly 100 yards. In the light of a fire engine searchlight I could see the buckled fuselage, the broken wings, engines and smaller parts strewn over the field.

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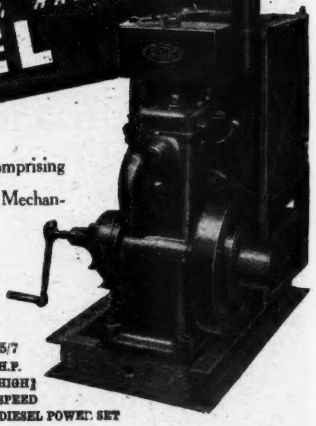

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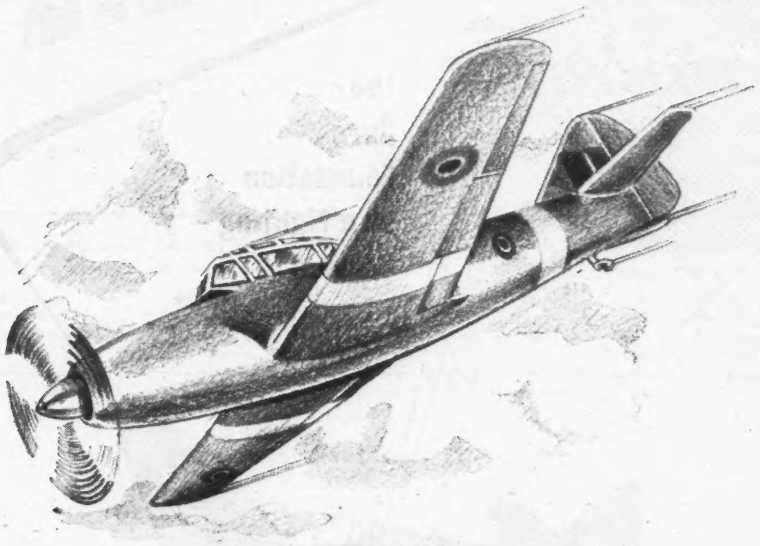

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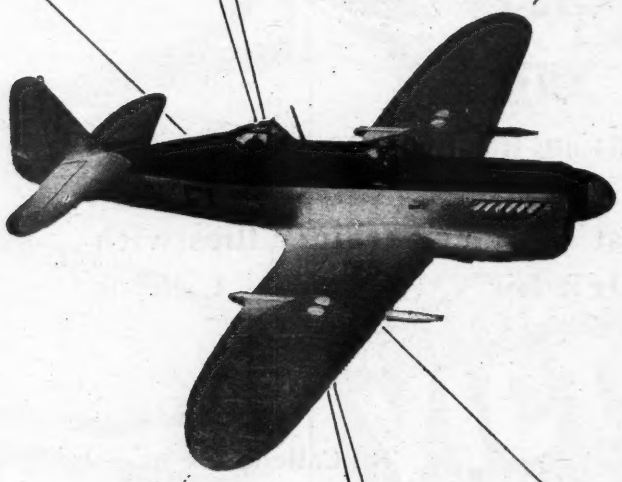

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No. 2050 Vol. LIII April 8th, 1948 Thursdays, One Shilling

The Outlook

This Air Transport Business

THERE is such a thing as agreeing too much, even in these days of international bickering. A case in point is a letter published this week on our Correspondence page. The writer has read with interest and approval the "Casual Commentary" in the March 18th issue. In that, it may be recalled, our contributor Robert Carling advanced the argument that air transport is fundamentally a costly business; that all the world has blinded itself to the fact; that it is time we all realised that air travel is a useful though extravagant means of transport; and that we should retain our belief in its value while facing the uncomfortable facts with realism.

It is the last-mentioned plea which the writer of the letter appears to have overlooked. In agreeing with the details of Robert Carling's arguments he fails to grasp the general situation. This is obvious from the fact that he suggests diverting the effort from civil air transport to improving surface transport, growing food, building houses and so forth. The parochial outlook thus brought to light arises, of course, from an incomplete appreciation of all the factors involved, political, geographical, industrial and technical. The modern world has become so involved, and the countries so interdependent, that no nation can afford to be "out of step." Rapid communications are the order of the day, and air transport would have to go on even if it were many times as expensive and many times as dangerous as it is. There have always been those who bemoan progress. In the days of the stage coach, the railway was a noisy, dirty and smelly nuisance to many. The early motor cars were regarded as dangerous contraptions and had to be preceded by a man with a red flag. The first flying machines were thought of as possibly good fun for sport, but never likely to have any practical value. Through the forcing house of two world wars the flying machine has developed into the present world-shrinking vehicle, and is nowhere near the end of its development. To argue that its use should be stopped is just as futile as it would be to suggest that for sea transport we should go back to sail.

When, however, our correspondent writes: "If we must have flying, then let us concentrate on safer flying and not on bigger and faster aircraft with more and better cocktail bars and cinemas" it is much easier to agree with him. Safer flying is very largely a matter of better ground aids and organization, but, again due to the interdependence of nations, these call for international agreements. I.C.A.O. is hard at work on this and many other problems, but to get agreement between a large number of independent interests is obviously no easy matter. What is not generally appreciated outside aviation circles is that it is no manner of use this country, for instance, having the most marvellous ground aids if, as soon as our aircraft cross into another country, quite different equipment is needed on board. The problems are much more complicated in aviation, but they have had their counterparts in other forms of transport.

The Other Flying

WHILE, as mentioned above, safety in air transport depends greatly upon ground aids and international agreements, there is another form of flying in which no such complicated machinery is necessary. Another reader puts in a plea in this issue for more strict enforcement of the flying regulations in relation to private flying. He quotes three cases in which fatal accidents were caused by over-enthusiastic or inexperienced pilots attempting to "show-off." Three cases, involving the death of six people, is a rather high proportion of the relatively small total number of private pilots in the country, and although the great majority do not give way to what is, after all, a perfectly human failing, there is no doubt that one could find many

APR 12 1948

instances in which disaster was averted by an uncomfortably narrow margin.

The summer season is approaching, and with it there will be increased activity at the clubs, in spite of all the obstacles raised by abolition of the basic petrol ration, the high tax on fuel and the general economic stringency. As our correspondent points out, it is up to the clubs themselves to see that members obey the regulations, and his suggestion that safety committees be set up in all the clubs, and that they be given powers to suspend members who contravene the regulations, is well worth a study. There may be cases when the rules of the club would have to be amended to give such safety committees the necessary powers, and it may be necessary to call extraordinary general meetings. But the effort is worth making if it results in the summer of 1948 being free from accidents due to irresponsible exuberance.

CONTENTS

Outlook	371
Intercepters	373
Here and There	376
Civil Aviation News	378
Hoverfly	381
Modern Trainers	382
Athena Advanced Trainer	383
The R.A.F.V.R.	389
Tarmac Control	390
Speed Recording	392
Correspondence	395
Service Aviation	396

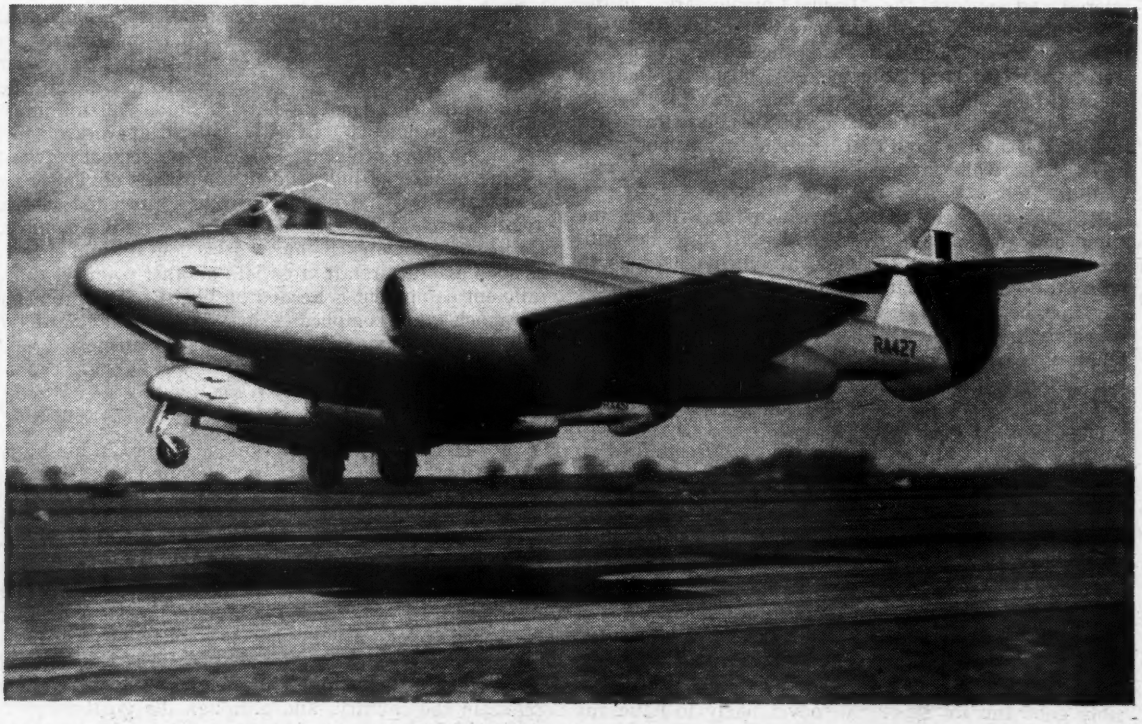
Forthcoming Events, page 395

Flying-Boat Operation

WHEN he officially opens B.O.A.C.'s new marine base at Southampton Docks next Wednesday, the Minister of Civil Aviation may make some reference to the future of flying boats in general. The position has been under consideration for a long time, and the non-committal reply which Lord Nathan gave in the House of Lords some time ago did not deny that the three big Saunders-Roe SR/45s might be scrapped; it merely stated that they would be considered "on their merits," whatever that may have meant.

It appears that, in spite of its present forced employment of flying boats, and its lauding of them for passenger-getting purposes, B.O.A.C. is not very interested and does not intend to use this type of aircraft longer than necessary. Doubtless this view is due largely to the fact that on the Empire routes the corporation has to provide its own marine bases. B.S.A.A., on the other hand, is believed to be in favour of flying boats, and certainly that corporation's new chief executive, Air Commodore Brackley, is not anti-flying boat. The fact that B.S.A.A. grew out of the private company formed by shipping interests may also tend to give the board a more informed appreciation of how flying boats can and should be used. Nor should it be forgotten that, in connection with trying to effect economies in the running of the three corporations, the suggestion has been made that B.S.A.A. should be given the North Atlantic as well as the South Atlantic route, an altogether more logical arrangement than the present.

To scrap the three Saro boats would be to abandon for all time any hope of having an alternative to the large landplanes, should this later prove desirable. It is to be hoped that the Government will not repeat the mistake made after the first world war, when a large Supermarine flying boat was "discontinued" after being nearly completed.



SCRAMBLE: With their Rolls-Royce Derwent V turbojets at full throttle, a section of Gloster Meteor IV intercepter fighters hastily departs from Horsham St. Faith. Some account of the work of these fighters—the fastest in service with any air force—is given in the following pages.

Precisely aligned, brand-new Meteor IVs of the Horsham St. Faith squadrons make a noble sight—and a perfect target. With twelve 20 mm. guns (plus bombs or rockets if required), a section of three Meteors, as seen sweeping along the line, could make short work of such a parade.

With the Meteor IVs at Horsham St. Faith

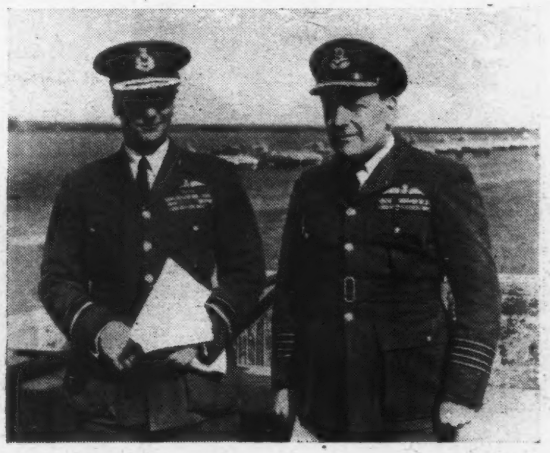
Illustrated with "Flight" Photographs

SINCE Group Capt. Wilson and Eric Greenwood topped 600 m.p.h. in Gloster Meteor IVs as long ago as 1945, the claim has been consistently advanced that this mark of Meteor has been standard equipment in the R.A.F. This has led to some misapprehension, for although the Mk IV Meteor has been delivered in quantity to Service units for a considerable time past, the full-scale employment of the type in squadron service is quite a recent development. It is now gratifying to receive an official assurance that sufficient Mark IVs are available to re-equip all Meteor squadrons of Fighter Command.

By happy coincidence, or good staff work, a visit to a Fighter Command station fully equipped with Meteor IVs—at Horsham St. Faith, near Norwich—fell on the 30th birthday of the R.A.F.

A V.V.I.P. York of No. 24 (Commonwealth) Squadron, Transport Command (the machine formerly used by the Duke of Gloucester), carried us from Northolt across East Anglia and out over the North Sea from a point just south of Lowestoft. As we orbited at 250 m.p.h., some twenty-seven miles off-shore, an R/T message announced that Meteors from Horsham St. Faith, fifty miles away, were being scrambled to intercept us. Within eight minutes, two sections of two aircraft each sailed effortlessly up from beneath our starboard elevator, their long fuselages, prominent nacelles and clipped wings showing livid against the grey-dappled sea seven thousand feet below. Swivelling our red-leather armchair, we kept them in sight as they withdrew to come in repeatedly for stern attacks, finally drawing alongside close enough for us to decipher their serial numbers and to set us wondering why their roundels should still be outlined in yellow.

Having landed at Horsham St. Faith, where we were accorded a most friendly welcome by G/C. D. G. Lewis, D.F.C., who commands the Eastern Fighter Sector of No. 12 Group, we were able to learn more about the interception, from the pilots engaged and from the officer in charge of the control and reporting organization. Our York



Air Vice-Marshal T. C. Traill, C.B., O.B.E., D.F.C., Air Officer Commanding No. 12 Group, Fighter Command, was an interested—and impressed—spectator. He is seen with G/C. D. G. Lewis, D.F.C., Eastern Sector Commander of the Group.

Intercepters . . . . .

had been picked up by radar at a comfortable distance, which need not be specified, and the Meteors, cruising at 520 m.p.h. under G.C.I. control, sighted us from 10,000ft, diving below the York and pulling up under the tail.

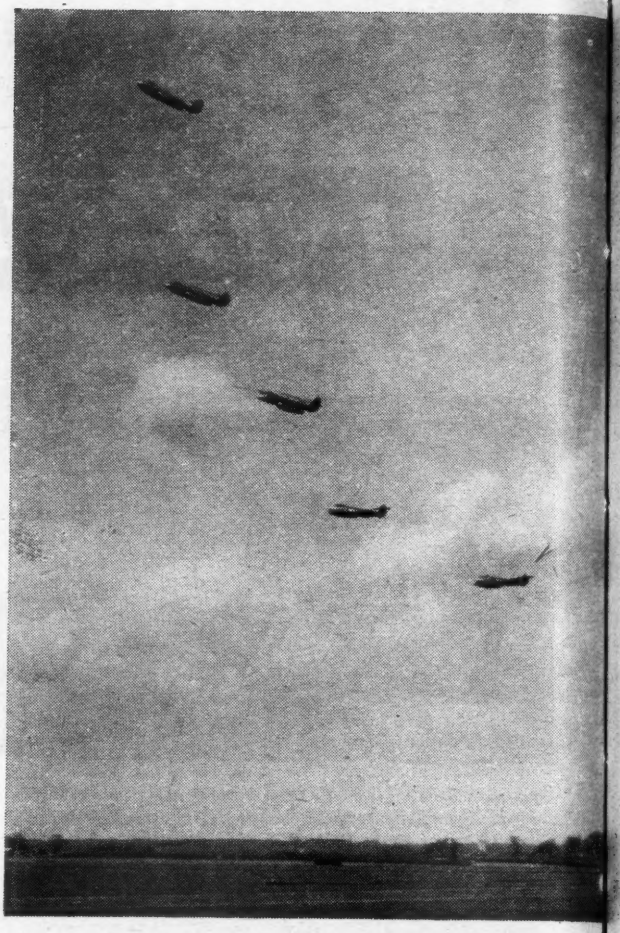
Business-like as this reception committee was, it could hardly convey, under the circumstances, a true picture of the Meteor's qualities as an intercepter fighter. Somewhat more realistic, though again hardly indicative of the machine's true capabilities, was a demonstration battle climb during which the pilot reported his height every few seconds, at every 1,000ft level. At "Angel's Seven" he broke cloud, and after six minutes from take-off declared himself at 25,000ft. On the previous day he had reached the same height in five minutes twenty-five seconds from the start of his take-off run, having climbed through 10/10th cloud for about 15,000ft. The best time to date for the 25,000ft climb is slightly more than 4½ minutes. Makers' figures show that under ideal conditions the rate of climb of the standard Meteor IV to 20,000ft averages 4,750 ft/min.

The most significant figure yet recorded during squadron training was an elapsed time of 4½ minutes between the command "scramble" and the pilot's report that he had delivered his attack at 15,000ft—the time including the starting-up of the Derwents. Thus far has Fighter Command progressed.

Brilliant Flying

That the squadron pilots—many of them relatively inexperienced on the Meteor IV—are the equal of the machines of which they are so justly proud was not to be doubted after a display in a wind which gusted up to 60 m.p.h. under forbidding cloud. The deficiencies which handicap the R.A.F. in many of its duties were certainly not apparent here. One saw only the world's finest intercepter fighters, flown in matchless style. With all reverence to Shakespeare and the victor of Agincourt, one could scarce forbear to conjure with ". . . Fighter Command, Whittle and Carter, Rolls-Royce and Gloster."

Regrettably, it is not permissible to give credit by reference to the individual squadrons engaged, but the formations and sections under Squadron Leaders Wootten, Lapsley, Ottewill and Richardson are to be congratulated on one of the most significant and spectacular displays yet put on at an operational station. Air Vice-Marshal T. C. Traill, Air Officer Commanding No. 12 Group, Fighter Command, who witnessed the proceedings, declared himself well pleased with their performance.



Meteor IVs peel-off after a demonstration of high-speed formation-flying in a wind gusting up to 60 m.p.h.

Formation take-offs by vics of three aircraft were followed by circuits and peel-off landings, with four to six Meteors simultaneously on the runway. The most remarkable manœuvre in a display of individual aerobatics by F/L. Scannell, a New Zealander, was a sustained inverted climb into cloud. Reappearing in a dive, his Meteor was shrouded in shimmering vapour.

Led by S/L. Ottewill, six Meteors defied the gusts in tight formation fly-pasts, the real merit of which could only be appreciated if the acceleration and deceleration characteristics of jet aircraft were borne in mind. An invisible lone Spitfire was set upon at 25,000ft, the Meteor pilots having received their met. briefing before "scramble" from a squadron pilot, in keeping with the new Fighter Command instruction that all pilots are to be capable of performing this task.

As a climax came an exhibition of dual aerobatics, which was quite unique—and this not solely because an American pilot (Captain Tucker, U.S.A.F.) was teamed with a British officer (F/L. Windle). From the start of the take-off the American pilot followed through like a shadow, in cloud-circling loops, rolls-off, and barrel—or, more descriptively, hogshead—rolls. Many observers saw a deep symbolism in this fraternal frolic. The pair having separated, Windle passed by with 450 knots

Officers who contributed to a remarkable display: (left to right) F/L. R. E. Windle, S/L. E. W. Wootten, D.F.C. and bar, Capt. A. S. J. Tucker, Jnr., U.S.A.F., and F/L. C. J. Barry, D.F.C., A.F.C., D.F.M.

on the clock at, it was judged, 10ft altitude. (One of his brother officers assured us that he does better on a smooth day). Both pilots remained inverted during some of their manœuvres for at least ten seconds, which is five seconds less than the period required for the Derwents to cease thrusting. The show was concluded with a series of delightful hesitation rolls.

Captain Tucker told us that back home he was testing and demonstrating P-80 Shooting Stars, which, with their ultra-sensitive controls, can probably out-roll anything in the air. They have a relatively long range, but lack the level speed and rate of climb of the Meteor.

Control and Reporting

The more intimate details of the complex ground organization required to enable the Meteors to intercept with accuracy must be withheld, but it can be said that the vastly greater heights and speeds at which modern aircraft operate have demanded reorganization of the control and reporting system to reduce or eliminate time lags in the various processes leading up to the interception. New and improved equipment has been found necessary and is now being introduced.

It is important to remember that the Fighter Command control and reporting organization co-ordinates all air defences of the country, and that fighters, anti-aircraft guns civil defence organizations, and even the Army and Navy are dependent upon the system for early warning of the approach of enemy aircraft, missiles and ships. The actual interception of enemy aircraft by fighters is controlled at master radar stations, but the task of destroying the enemy is shared by the crews in the air and the controllers on the ground.

When "early warning" information is received at the reporting stations, it is instantly relayed along the land-lines to control stations. Here it is filtered, identified and presented to the fighter controllers who are allotted specific raids to intercept. The interception is made on cathode-ray tubes in special G.C.I. cabins, from which the necessary instructions are passed by the controllers to the fighters by V.H.F./R.T.

METEOR IV FACTS AND FIGURES

Power plant	Two Rolls-Royce Derwent V turbojets
Span	37ft 2in
Normal flying weight ...	15,000ft
Internal fuel	325 gal
Maximum fuel	705 gal
Armament	Four 20 mm guns. Provision for two 1,000-lb bombs or eight 90-lb R/Ps
Maximum speed	585 m.p.h.
Initial climb	7,500ft/min
Climb to 40,000ft ...	10 min
Service ceiling	46,500ft
Max. endurance (325 gal)	1.3 hr
Max. endurance (705 gal)	2.8 hr
Remarks	Pressure cabin and air brakes are standard. Two-seat trainer version already flown

(N.B.—A later version, with longer fuselage, has increased endurance.)

Flight Lieutenant M. Scannell—a highly individual aerobat from New Zealand.

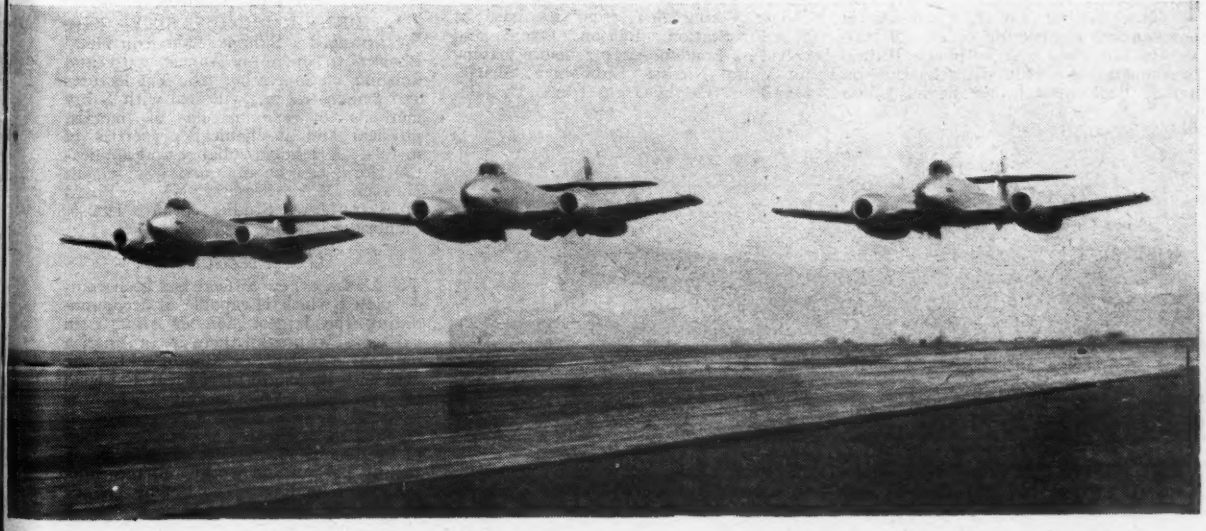
A vital part in the control and reporting of raiders will in future be played by the new Air Defence Units of the Royal Auxiliary Air Force, now being set up, as part of Reserve Command, throughout the country. Manned by volunteers, many of them ex-members of the R.A.F. and W.A.A.F., these units practise at week-ends or during annual continuous training periods, but they are so organized that on mobilization, or in an emergency, they could instantly go into action on a round-the-clock, watch-and-watch, basis. The nearest unit to Horsham St. Faith is No. 3620 (Norwich) Air Defence Unit.

Sharing Horsham St. Faith with the Meteor squadrons is a unit equipped with Spitfires, Martinets and Oxfords, and responsible solely for providing targets for anti-aircraft gunners under training in East Anglia. What its work lacks in spectacle it provides in usefulness.

In the repair and inspection section, W/C. Tompkins and S/L. Williams explained the planned flying and planned servicing scheme now operating on the station. The new scheme, which was described in *Flight* of March 25th, 1948, is not so readily adaptable to a fighter station as to a bomber station or O.T.U., but W/C. Tompkins was emphatic that it is paying hands down.

Everywhere one found abundant evidence of efficiency and in all spheres of activity—not forgetting the farm—Horsham St. Faith is a real credit to Fighter Command.

Meteors scramble with characteristic smartness from Horsham St. Faith. A formation take-off has little operational significance but reflects credit on the aircraft and pilots.



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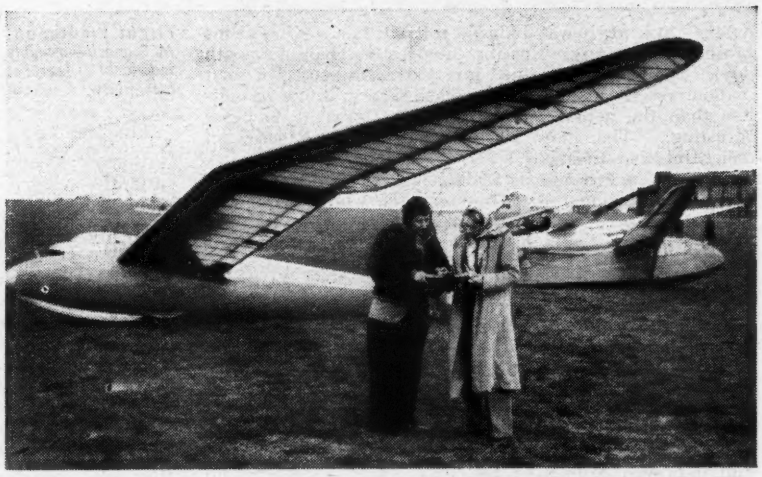


GLIDING HOLIDAY: The Aeronautical College, Cranfield, Beds, held an Easter rally of gliding enthusiasts which was attended by many private owners and members of gliding clubs. A new system of air-tow launching was tried out.

Spitfire in South America

AFTER nearly a year in South America the privately owned Spitfire belonging to Capt. J. Storey, now in business in Buenos Aires, has given remarkable service. In spite of being parked in the open in a humid, sub-tropical climate the only maintenance has been what Capt. Storey has done himself with ordinary hand tools. As reported in *Flight*, May 8th, 1947, Capt. Storey, an ex-R.A.F. pilot, flew this Spitfire to South America via Dakar, having had it equipped with long-range tanks.

Wright's by Adoption

IN a class of gas turbine units known in America as turboramjets, the XJ-37 illustrated on page 377, is being developed as a turbojet with thrust augmentation by after-burning. An airscrew turbine may also be built. It produces around 5,000 lb thrust, but is said to be capable of development up to 8,000 lb. The chief characteristics of this long, axial-flow power unit are the small frontal area and what is described as "spectacularly low" fuel consumption.

Paint Display

THE Paints division of Imperial Chemical Industries, Ltd:, opened a display on April 5th at the Grand Hotel, Birmingham, designed to show "How Paint Helps Exports." This display illustrates how modern finishing techniques can combine first-class sales appeal and protection with low cost; a sound film in colour, "The Technique of Spray Painting," will be shown daily at 11.45 a.m., 2.30 p.m., and 4.30 p.m. April 9th is the closing date.

Anglo-American Research

IN a speech in Melbourne recently Professor Arthur Collar, professor of aeronautical engineering of Bristol University, disclosed that, although Britain is co-operating closely with the U.S. on aeronautical research, the Soviet Union is now withholding information which was formerly made available. Professor Collar also forecast that British jet propulsion would be fully commercialized in five years. He is at present attending an aeronautical research conference at Canberra.

Irish Invitation

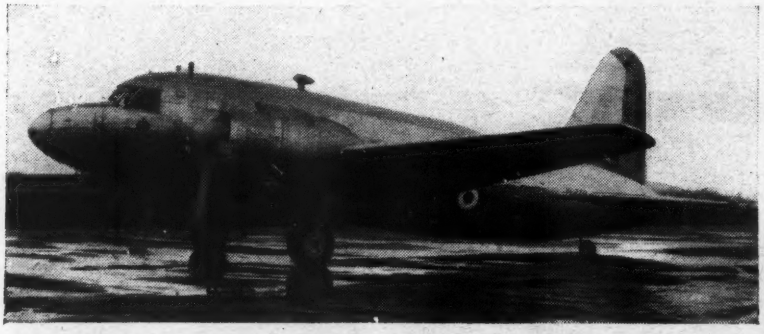
THE landing ground at Farmer's Cross, Cork, is shortly to be reopened and Weston, Ltd., of Weston Park Aerodrome, Leixlip, Co. Kildare, would be interested to hear from pilots who would like to fly over and demonstrate aerobatics on the opening week-end. Customs facilities are to be provided at Cork and further details can be obtained from Capt. P. W. Kennedy, of Weston, Ltd.

King's Flight Aircraft for Antipodes

ONE of the aircraft of the King's Flight left this country on March 26th, taking Air Commodore E. H. Fielden, the Captain of the Flight, to inspect airfields in Australia and New Zealand likely to be used during the Royal tour early next year. The visit is being made at the invitation of the Australian and New Zealand authorities.

The Viking flew from its base at R.A.F. Station, Benson, Oxon, and called at London Airport before leaving for Malta, Nicosia, Habbaniya, Sharja, Mauripur, Palam, Dum Dum, Mingaladon, Singapore, Sourabaya and Darwin. The aircraft will make brief halts in Australia at Townsville and Cloncurry before flying from Brisbane to Auckland via Norfolk Island. After airfields in New Zealand have been inspected, the aircraft will return to Australia to visit those which might be used on the Royal tour.

The pilot is W/C. E. W. Tacon, commanding officer of the King's Flight, the navigator F/L. D. Fowkes, and the wireless operator F/L. L. G. Reed, all of whom were with the Flight on the Royal tour of South Africa. Five ground staff are also carried—Sgts. F. J. Hardyman and T. E. Shore, Corporals J. Parker and D. A. Sealey, and Aircraftman J. F. Paterson.



ROYAL VIKING: An aircraft of the King's Flight photographed before taking off for a six weeks' survey in preparation for the Royal tour of Australia next year. Air Commodore Fielden will make a personal report to the King on his return.

Expedition Abandoned

THE aerial exploring expedition sponsored by Mr. Milton Reynolds to measure the Amne Machin mountains has been abandoned following an accident to the expedition's aircraft. During taxying one wheel sank into soft earth and the undercarriage collapsed, causing damage to the airscrews and wing-tip; no one was injured.

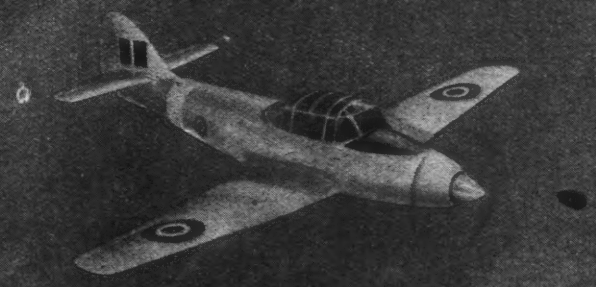
Physics Studies

CAMBRIDGE UNIVERSITY have arranged a Summer School in Metal Physics to open on August 23rd and finishing on September 3rd. The lectures and demonstrations will deal with X-ray methods of examination of metals, physical and mechanical properties of metals. A detailed syllabus and application form can be obtained from G. F. Hickson, M.A., Secretary of the Board of Extra-Mural Studies, Stuart House, Cambridge.

U.S. Precautions

IN Alaska a new airfield has been completed which is capable of accommodating the largest bomber aircraft in existence; at present there are in America only three airfields capable of taking the B36 with its length of 163 feet and span of 230 feet. This machine, which is powered by six 3,000 h.p. engines, is claimed to be capable of carrying a load of 83 tons or of carrying an atom bomb to any part of the world and returning without refuelling. The Boeing factory at Witchita, Kansas, is being re-opened

The choice of experience



The Avro Athena in both piston-engine and turbine versions is fitted with de Havilland high-efficiency constant-speed propellers

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after being placed on a standby basis after the war; modernization of existing types will be carried out at this plant.

Hong Kong Plans

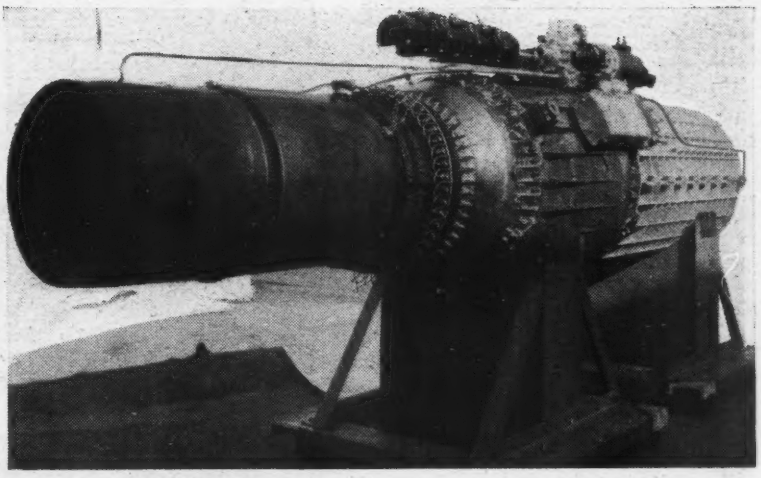
THE Hong Kong Government estimates for the coming year include a sum of £250,000 for starting work on a new airfield as soon as a suitable site has been found. This would represent only a fraction of the final cost of such an undertaking, and the question of financing the undertaking is said to be under discussion with the U.K. Government.

Patent Action

THE Glacier Metal Company, Ltd., who were recently involved in a High Court action for alleged infringement of a patent relating to thin wall bearings, have had the decision given in their favour. The plaintiffs were the Cleveland Graphite Bronze Co., and Vandervell Products, Ltd. Giving judgment on March 24 Mr. Justice Wynn-Parry held that the patent in question was invalid by reason of a disclosure made in a journal available to the public in this country before the date of the Letters Patent. Consideration of the form of order to be made was left over until April 6th.

Air Mail Costs

THE Postmaster-General, in reply to a question in Parliament recently, stated that the airmail revenue for the fiscal year 1946-7 amounted to £6,097,000. The Post Office handling costs were estimated at £991,000. During the year in question sums of £147,000 and £188,000 were paid to B.E.A. and B.S.A.A. respectively, while under a wartime agreement then in force, £3,983,000 was paid to the M.C.A. for mails conveyed by B.O.A.C., B.E.A. and Transport Command. He was unable to give details of how this latter sum was apportioned.



NOBODY'S BABY: The outcome of a 1941 Army Air Force contract given to the Lockheed Aircraft Corporation and designed by Nathan C. Price, but later handed over to Menasco, the Lockheed-Menasco L-4000 (XJ-37) has recently been given high priority and passed on to the Wright Aeronautical Corporation of Wood-Ridge for more rapid testing and development.

News in Brief

Sir George Beharrell, chairman of Dunlops, returned from his visit to the Australian Dunlop Company on the *Stratheden* on March 30.

* * *

The Afghan Air Force has ordered 12 Ansons complete with six spare Armstrong Siddeley Cheetah engines at a total cost of nearly £250,000. Delivery is expected to be completed this year.

* * *

One cruiser and three light aircraft carriers of the Colossus class of 14,000 tons standard displacement, at present nominally under construction, are to be laid up indefinitely. Precautions are being taken to preserve them while the work on these craft is suspended.

We regret that when announcing the appointment of Mr. C. E. Patterson, D.S.O., D.F.C., as air freight manager of Instone Lines, Ltd., we incorrectly referred to the company as Instone Air Lines, Ltd.

* * *

The Ghost-engined Vampire which recently recaptured for Britain the world's altitude record, was constructed for the Ministry of Supply and entered jointly by the Ministry and the D. H. Company.

* * *

Mr. B. W. Middleton has been appointed sales manager of Dunlop Clothing and Weatherproofs, Ltd. During the war Mr. Middleton was deputy director of clothing and textiles at the Ministry of Supply.

* * *

The French Air Force in North Africa has been reinforced recently and it is said that a major part of France's air strength is being concentrated in her North African territories as part of her "imperial strategy" recommended by General Juin, Resident General in Morocco.

* * *

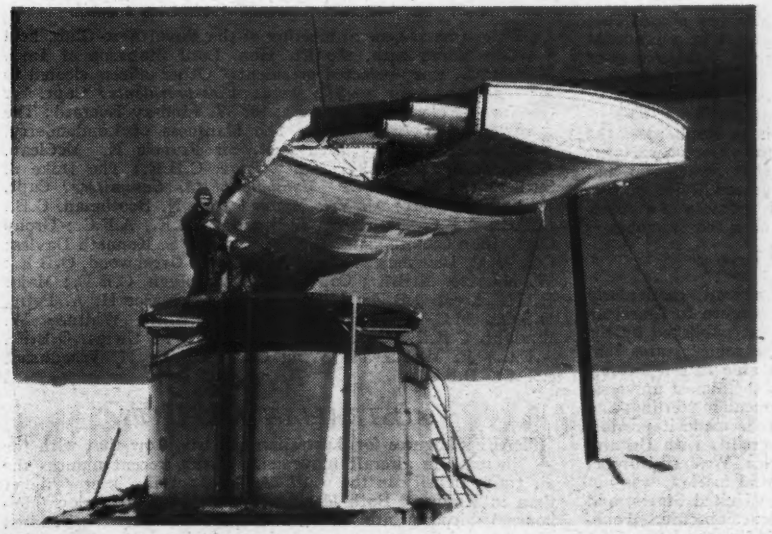
Lord Portal of Hungerford, who was appointed Controller of Production, Atomic Energy, in the Ministry of Supply in March, 1946, has asked to be relieved of his duties. He has agreed to continue to act on a part-time basis and without salary for a further year.

* * *

B.E.A. have appointed Mr. Beverley S. Shenstone, F.R.Ae.S., A.F.I.Ae.S., M.A.Sc., to be chief engineer. He will supervise engineering standards throughout the Corporation, both in connection with the maintenance of aircraft already in use and with the development of new types.

* * *

In Northern Rhodesia recently military and civil aircraft successfully located a Magister which had been lost between Tabora and Kasama; the machine was found after it had force-landed on rough ground, wrecking the undercarriage. There were no casualties.



REAPING THE WHIRLWIND: On behalf of the U.S. Air Forces the General Electric concern is undertaking, with the aid of the special rig shown, the development of components for ambitious jet-propelled helicopters. The pit containing this impressive apparatus is 150ft in diameter and 13ft deep.

SOUTHAMPTON MARINE AIRPORT: Lord Nathan, Minister of Civil Aviation, will open the B.O.A.C. marine airport on April 14th. Although not officially opened, this airport has been in use since April 1st. Following the opening ceremony, the Mayoress of Southampton will name one of the B.O.A.C. Short Solent flying boats, the Royal Mail Aircraft "Southampton."

Report on American Aviation Policy: Air Traffic in Australia: First Alitalia Service

CIVIL AVIATION NEWS

I.C.A.O. LICENSING DISCUSSIONS

THE third session of the Personnel Licensing Division of I.C.A.O. opened in Montreal on March 30th. This meeting aims at standardizing the qualifications for pilots, flight crews, and ground personnel engaged in international air transport, and is expected to continue for three weeks. A further study will be made of the personnel licensing requirements, which were not completed at the two previous sessions of this Division, such as the requirements for senior commercial pilots, and the medical requirements for licensed personnel. These may have to be revised in the light of recent medical research work carried out at the Medical Examination Centre in Paris, which indicates that the application of the hearing requirements agreed upon at previous sessions might result in the rejection of a large number of pilots after between 3,000 and 4,000 hours' flying. Among the new subjects to be brought up for discussion are international standards for pilots of private and commercial gliders, airships and helicopters. The question of establishing a grade of non-piloting aircraft commanders will also be considered; experience has shown that many airline captains cease active employment in aviation at the comparatively early age of 45, resulting in a serious loss of experienced transport pilots. If these pilots could be permitted to continue in command of aircraft, although not actually at the controls, their experience and judgment would not be lost. One of the major tasks of this Division is to standardize the curricula of approved training courses for aeronautical personnel, because experience has proved that systematic and continuous courses result in the more rapid qualifying of personnel for licences, and uniformity will promote the international standardization of personnel licensing requirements.

CONGRESSIONAL REPORT

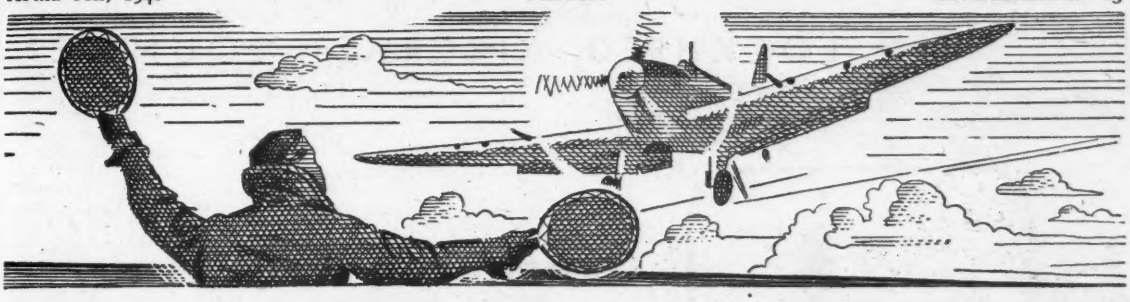
COMPETITION in the sale of aircraft abroad, particularly from Britain and Sweden, is causing concern to American aircraft manufacturers, according to a report published by the Congressional Aviation Policy Board. The report states that Britain is in the happy position of being able to sell aircraft to countries which although suffering from the almost universal shortage of dollars were able to make payment in sterling; and where this was not feasible her import needs made it possible for other nations to establish favourable credits with Britain, in direct contrast to the situation in America. Western Europe, in particular, which formed a large potential market, was not in a position to purchase aircraft from the United States; and Russia, whose intentions were at present obscure, would undoubtedly not experience difficulty in finding ready markets for her aircraft. Another source of anxiety to U.S. manufacturers was the large number of war surplus aircraft at bargain prices which had flooded markets abroad. Drawing attention to the increases in cargo and passenger traffic over the past two years, the report stressed the need for urgent action by the government to promote the sale and use of American aircraft abroad, and the necessity for maintaining overseas bases for civil and military aircraft. Other proposals put forward by the Board for the improvement of the position of the U.S. in international air transport were: that there should be more efficient protection of U.S. air carrier interests by international bilateral agreements; that to avoid circumvention of the 1938 Civil Aeronautics Act actual partnership and control of foreign air carriers should be considered with a view to preventing any air carrier entering the United States, unless that carrier was actually owned and controlled by nationals of the country concerned; that the present method of fixing rates should continue; that the U.S. should give full support to I.C.A.O. to achieve uniformity in aviation matters; that the removal of travel barriers should be urged internationally; and that financial help should be given for the establishment and maintenance of international airways and communication aids.

ROYAL AERO CLUB COMMITTEE

AT the annual general meeting of the Royal Aero Club, held on March 24th, the Rt. Hon. Lord Brabazon of Tara, M.C., P.C., was re-elected president. Other officers elected to serve for the year 1948/9 were: *Vice-presidents:* Capt. Sir Geoffrey de Havilland, O.B.E.; Sir W. Lindsay Everard; The Lord Gorell, C.B.E. M.C.; The Marquess of Londonderry, K.G., P.C., M.V.O.; Lieut.-Col. Sir Francis K. McClean, A.F.C.; Sir Frederick Handley Page, C.B.E.; The Duke of Sutherland, K.T., P.C. *Members of the Committee:* Capt. K. J. G. Bartlett; Air Vice-Marshal John N. Boothman, C.B., D.F.C., A.F.C.; Capt. H. S. Broad, M.B.E., A.F.C.; Group Capt. John Cunningham, D.S.O., D.F.C.; S. Kenneth Davies; Col. W. C. Devereux; Francis Francis; E. Greenwood, O.B.E.; W. Humble, M.B.E.; Capt. A. G. Lamplugh, C.B.E.; Major R. H. Mayo, O.B.E.; H. W. H. Moore; Major H. A. Petre, D.S.O., M.C.; Major J. Stewart, O.B.E.; Whitney W. Straight, C.B.E., M.C., D.F.C.; Capt. C. F. Uwins, O.B.E., A.F.C.; F. Woodhead; Wing Cdr. Norman H. Woodhead, A.F.C., D.S.C.

AUSTRALIAN AIRPORTS

TRAFFIC figures for Australian airports show that with the increase in aircraft movements during recent months the air traffic density in the south-east of Australia is now higher than in Europe. Both Mascot (Sydney) and Essendon (Melbourne) airports are now each handling over a hundred scheduled airline movements a day. At Essendon the number of movements of radio-equipped aircraft each week increased from 546 in March, 1947, to 1,040 for the week ended December 13th, and on Christmas Eve 196 airliner movements were handled, while on several other days recently the total has



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Smiths Sensitive Airspeed Indicator

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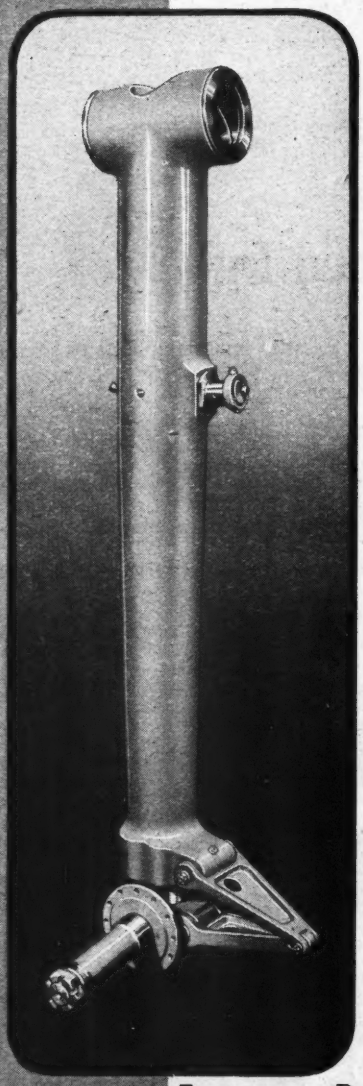


Cantilever strut for the AVRO 'ATHENA'

Typical of the established Lockheed standard of practice and workmanship is this cantilever shock-absorber strut for the 'Athena' advanced trainer.

Lockheed shock-absorber struts are used on many other leading aircraft, including high-speed jet planes.

Other Lockheed specialities for aircraft are the 'Servodyne' system of power assistance for flying controls, the Mark VI engine-driven hydraulic pump, selector valves (manual and electro-hydraulic), jacks for flaps, undercarriages, and a specially developed 'releasable' arrester hook for deck-landing aircraft.

HIGH PRECISION HYDRAULICS

Lockheed hydraulics

AUTOMOTIVE PRODUCTS COMPANY LTD., LEAMINGTON SPA

Civil Aviation News . . . . . .

exceeded 150 a day. Besides these, there are at least 8,000 movements a month at Essendon of light aircraft not equipped with radio, many of them being training flights by club machines.

At Mascot the average weekly traffic rose from 542 in April, 1947, to 745 in December. There the average number of movements over the Christmas period amounted to about 150 per day. Comparative figures for Australian and European airports show that the busiest quoted by B.E.A. was Northolt, with 631 weekly movements, while Essendon logged 1,040. Figures for Copenhagen and Sydney were 614 and 716 respectively.

New problems of air traffic control arise with this increased density in traffic. At Essendon the airfield controller sometimes has 15 machines in the air to look after at once, and the total number of aircraft flying in the Essendon Flight Information Region is frequently as high as 25. No efforts are being spared in the selection and training of control staff, I.C.A.O. procedures have been standardized, as has also the framework of a system to streamline the work of handling the increasing density of aircraft movements.

FRENCH JET TRANSPORT

THE S.N.C.A. du Centre is collaborating with the French Service Technique et Industriel de l'Aeronautique in the design of a 40-passenger transport aircraft designated NC-290. Four Hispano-built Nenes will be installed in pairs and a speed of 400 m.p.h. has been mentioned.

FIRST ROME-LONDON SERVICE

EVEN taking into consideration the fresh wind at Northolt airport on Saturday, April 3rd, the approach and landing of the Savoia Marchetti 95 from Rome on the first Alitalia service was unbelievably slow, and was reminiscent of the days when low-wing loadings were the fashion. Over the boundary the 30-seater Italian four-engined transport was many feet too high by modern standards, but to everyone's surprise it sank gently and, when a few hundred yards down the runway, landed gracefully, albeit on one wheel, and rolled on down the runway nearly an hour late on schedule. The Italian Ambassador, His Excellency the Duke Gallarti Scotti, and the chairman and executives of B.E.A. were at the airport to welcome the managing director of Alitalia, Signor L. Acampora, Mr. D. L. Craig, the B.E.A. resident director of the company, and the 14 farepaying passengers.

This aircraft, the *Sebastiano Caboto*, is one of five, all named after famous navigators, which have been flying between Rome and Paris, but this was the first to land at a London airport. Alitalia pilots have flown non-scheduled services in Lancastrians from this country. The S.M. 95 was designed before the war, and is of wooden construction. Although the original intention was to fit Alfa Romeo engines, the transport is now powered by four Bristol Pegasus engines, which, incidentally, have a very neat installation. The company are also operating four Fiats with Pegasus engines, three with Alfa Romeo engines, and six Lancastrians.

The cubic capacity of this aircraft is small and the fuselage is fitted with a double row of seats on the starboard side and a single row on the port side, but the fuselage is narrow and the roof is low; in fact, the seating accommodation is rather cramped. Oxygen is supplied not through masks but through a flexible tube and nozzle. The S.M. 95 has a cruising speed of 170 m.p.h., and the flight from Rome to London takes six hours. Services will operate direct from Rome to London on Tuesdays and Saturdays, returning the following days, but once a week there will be an additional service from Rome through Milan and London to Manchester, the total flying time being nine hours. The normal crew carried is two pilots, two wireless operators, one engineer, and one steward. The Italian company have, in the S.M. 95, an aircraft which, although designed before the war, would appear to have an ideally slow approach and landing speed and other safety features, but one serious deficiency is that no anti-icing equipment is at present installed.

APPOINTMENT CONFIRMED: Air Commodore H. G. Brackley, C.B.E., D.S.O., D.S.C., has, as envisaged in "Flight," March 18th, been appointed to the Board of B.S.A.A. and to be the Corporation's Chief Executive. With him in this photograph is the B.S.A.A. chief technical adviser, Mr. J. W. Kenny.

FIRST SERVICE: The Savoia Marchetti 95 flown by Aerolinee Italiane Internazionali at Northolt on April 3rd. The double undercarriage wheels, and the neat Bristol Pegasus installation can be seen.

BREVITIES

AS from April 18th the Polish airline LOT will fly two services a week on the 4-hour schedule in Languedoc aircraft between Warsaw and Paris.

* * *

Passenger traffic and freight handled during February, 1948, by B.E.A. shows a substantial increase over that of February last year. It is partly explained by the inclusion of Channel Islands traffic since Channel Islands Airways was not incorporated into B.E.A. until April 12th, 1947. In the Continental Division alone, however, traffic increased by 182.8 per cent, and 9,361 passengers were carried as compared with 3,310 last year. The actual number of Continental services completed increased from 374 to 620, and showed a regularity of 97.5 per cent as compared with 65.4 last year.

* * *

A meeting of the creditors of L.A.M.S. and of others interested in the company's affairs was held recently in London, when a scheme for the reorganization of the activities of L.A.M.S. and arrangements with the creditors were discussed.

* * *

A weekly air freight service began on March 30 between Reading and Kirkwall in the Orkney Islands. A Miles Aerovan is being used on this route, operated by

Civil Aviation News . . . . .

Air Cargo Distributors, Ltd., a company which has been formed under the chairmanship of Sir Basil Neven Spence, M.P., for the Orkney and Shetland Isles. Other directors are Mr. H. C. Martineau, Mr. M. Adams, S/L. J. M. Clark, Col. J. E. Henderson and Mr. A. Mackay. Mr. C. E. S. Walls, solicitor, is secretary of the new company.

* * *

The Australian Minister for Air, the Hon. Arthur Drakeford, has announced that the subsidy paid to flying clubs is to be doubled this year to £A40,000.

* * *

As from April 1st, 1948, Central African Airways are running four services a week between Salisbury, Bulawayo and Johannesburg. South African Airways have made connections available to Cape Town and Durban to link up with this new service.

* * *

A suggestion has been put before I.C.A.O. that experienced civil pilots who are no longer physically qualified to fly as pilots may become non-flying aircraft commanders.

* * *

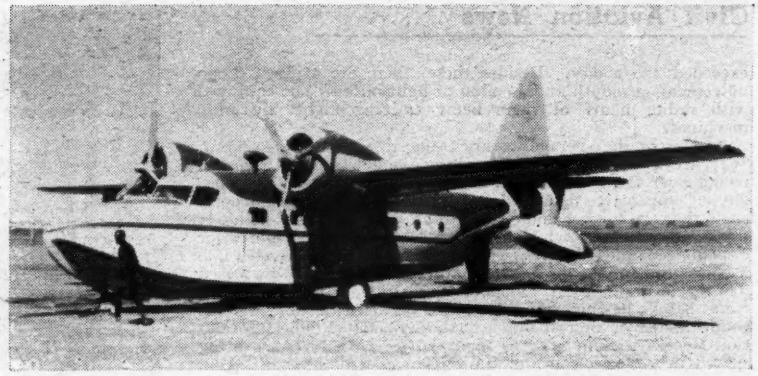
Pan American Airways international air cargo shipments during March increased by over 15 per cent on the shipments during February. An increase of more than 50 per cent of the figure for March, 1947, was recorded, the figures being 1,550,572 lb and 2,383,050 lb for March, 1947 and 1948, respectively.

* * *

I.A.T.A. have announced that as from April 1st the fares from New York to London are to be increased by $25. This brings the fare up from $325 to $350. Increases in other transatlantic fares are expected. The increase does not apply to return fares which remain unchanged.

* * *

The first post-war commercial air service from London to Munich was started on April 4th by Pan American Airways. These flights will be made on Tuesdays and Saturdays, return flights being arranged for Wednesdays and Sundays. The fare is £17 10s, and stops will be made at Brussels and Frankfurt.



GRUMMAN MALLARD: Photographed at Eastleigh, Nairobi, where it landed recently, this amphibious aircraft is powered by two Pratt and Whitney Wasp engines, giving it a maximum speed of 215 m.p.h. Described in "Flight," January 2nd, 1947, the Mallard is designed to carry 8 to 10 passengers.

* * *

Beginning this week Italian Airlines are starting a weekly service between Rome, via Milan and London, and Ringway airport, Manchester. The flights from Rome are scheduled to take place on Wednesdays and an overnight stop at Ringway will be made, the return flight beginning on Thursdays.

* * *

The U.S. Civil Aeronautics Board has authorized American Overseas Airlines to operate air services between Hamburg, Bremen, Cologne and Dusseldorf. These will link up with the daily flights between New York and Frankfurt at present being made by A.O.A. The date for the new service to begin will be announced shortly.

* * *

Mercury Airways of Johannesburg are now offering return flights to England at a price of £220; three flights per week are made and passengers may also book to Geneva for £215 or Rome for £210. Special excursions will be flown to the British Industries Fair for £275, which includes three weeks' hotel accommodation and first-class rail travel in Britain.

FROM THE CLUBS

At White Waltham Airfield a double white cross in the signals area and two red balls on the watch tower are displayed to indicate to pilots that gliding is in progress. This takes place on Wednesday afternoons, Saturdays and Sundays and the gliding paths are generally to the south of the landing strips used by powered aircraft.

* * *

The first post-war dinner and smoking concert of the Herts and Essex Aero Club was held at the Hungaria Restaurant, W.1, on March 23rd. Mr. V. A. Ercolani was in the chair and said that the Pilots' Committee wished to promote more of the competitive spirit among flying members. To this end a number of flying competitions, including cross-countries, aerobatics and forced landing, had been arranged, details of which were outlined by Mr. S. A. Perrin, Hon. Secretary of the Pilots' Committee.

* * *

Experiments in aerial surveying have been carried out by the Darlington and District Aero Club during the past two months. These have been connected with the erection of overhead electric power lines. In the ordinary way engineers have to spend a great deal of time travelling and obtaining permission to enter private land before surveying can begin, but by air schemes can be planned in a very much shorter time. These surveys and photographs were undertaken by a member of the club, F/L. T. A. George, in a club aircraft piloted by the Chief Flying Instructor.

* * *

Scotland's second R.A.F. Reserve Flying School—No. 13 R.F.S.—is due to open this month at Grangemouth and will be operated by Airwork, Ltd., who already operate No. 11 R.F.S. at Scone airfield, Perth, and No. 21 E.F.T.S. at Booker. The commanding officer at Grangemouth will be W/C. F. D. Nugent and the C.F.I. will be S/L. A. F. Underhill. Recruiting of R.A.F.V.R. and W.A.A.F. (V.R.) pilots to train at the new school has begun at No. 101 Reserve Centre, R.A.F., Bishopbriggs, Glasgow, and recruits in the east of Scotland may apply through No. 66 (Scottish Reserve) Group Headquarters at the R.A.F. Station, Turnhouse.

* * *

The annual general meeting of the Ultra Light Aircraft Association will take place on April 10th at the Royal Aero Club Aviation Centre, Londonderry House, 19, Park Lane, W.1, at 2.15 p.m. After the meeting there will be a full Council meeting to decide the policy for the next twelve months. Groups and Associate Members are requested to nominate representatives for this meeting, and to forward their nominations to the hon. secretary of the U.L.A.A. The possibilities are being considered of holding a series of summer camps to provide flying instruction up to "A" licence standard. Those attending such camps would be charged an inclusive price for food and accommodation in addition to the cost of flying instruction.

* * *

During the first ten weeks of the year the Wiltshire School of Flying has completed 480 hours of flying, both dual and solo, which, considering the time of year and generally poor weather, indicates the enthusiasm of the members to support the school's activities, which will continue regardless of the lack of Government support either by direct subsidy or relief from the petrol tax. Since January 1st there have been 12 first solo flights and 18 members have qualified for their "A" licences. The school wish it to be made clear that Thruxton is open to *all* visiting aircraft, that there are no landing fees for private or club aircraft, and that prior permission need not be sought for landings between dawn and dusk. All visitors by air will be welcomed and may avail themselves of facilities for obtaining petrol and oil in addition to clubhouse and overnight accommodation.

GIPSY *Proven* RELIABILITY

for the aircraft of to-day

Short Sealand, fitted with two Gipsy Queen Series 70 geared and supercharged engines of 345 b.h.p. each, driving de Havilland constant-speed, feathering and braking propellers.

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GIPSY ENGINES

DH ENGINES

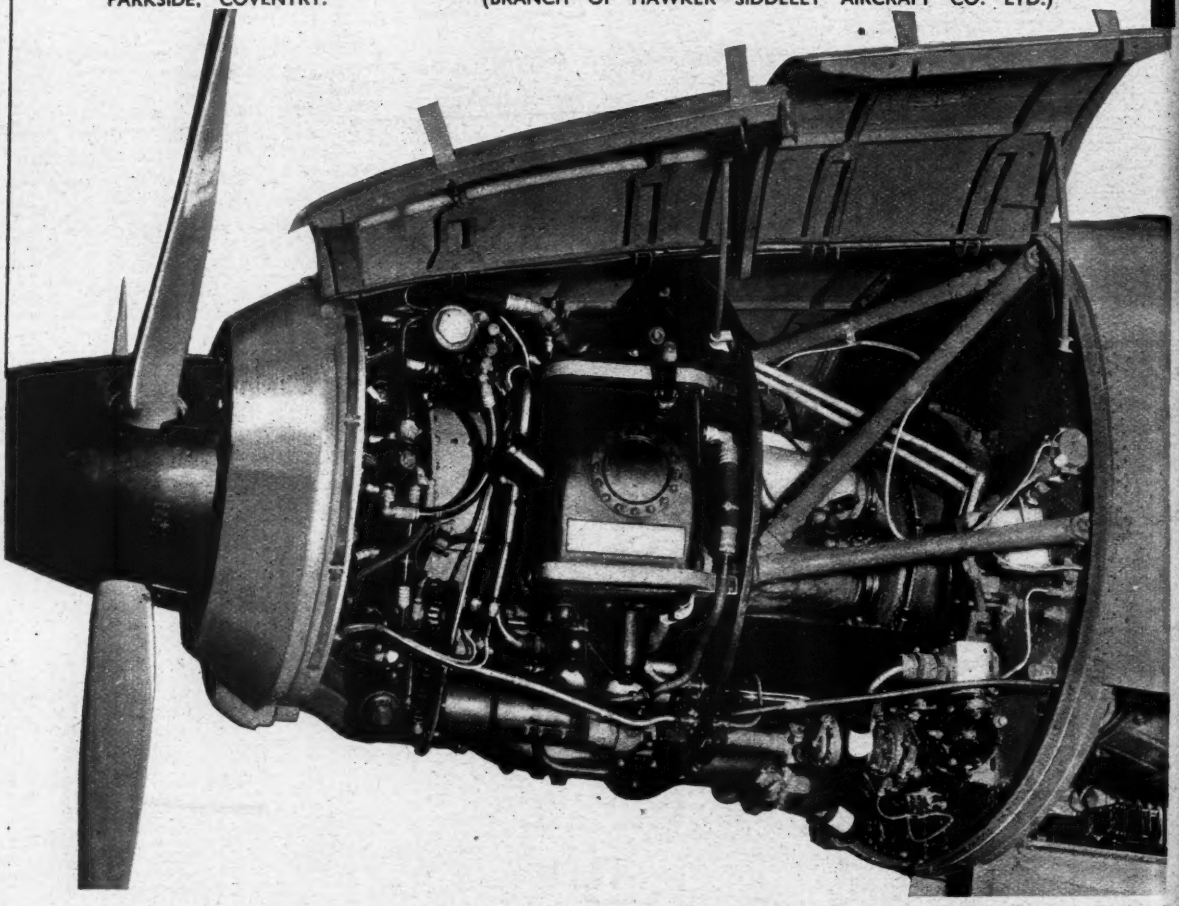
BY MERIT AND BY BIRTHRIGHT

the Mamba propeller turbine takes its place as the power unit of the new Athena trainer, and inherits the well-earned reputation of the Lynx and the Cheetah, its famous predecessors in the long line of Avro trainers.

Comparative power and weight figures:

Date	Engine	Aircraft	Rated Power	Net dry weight	Specific weight
1924	Lynx IVc	504N	215 h.p.	515 lb.	2.4 lb./h.p.
1934	Cheetah IX	Anson	310 h.p.	635 lb.	2.0 lb./h.p.
1948	Mamba	Athena	1145 e.s.h.p.	760 lb.	0.67 lb./e.s.h.p.

ARMSTRONG SIDDELEY MOTORS LIMITED
PARKSIDE, COVENTRY. (BRANCH OF HAWKER SIDDELEY AIRCRAFT CO. LTD.)



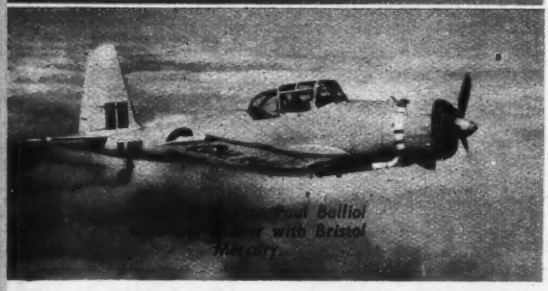
HOVERFLY

THE grimly militant atmosphere conveyed by these studies of a Sikorsky Hoverfly II, co-operating with the army at Larkhill, is offset by the pictorial charm and quality of the photographs. A "military adviser" who served with the 7th Armoured Division, vehicles of which are seen, points out that, in the view below, self-propelled guns (25-pounders) are in the foreground and that the half-tracked vehicle behind them would carry the Gun Position Officer. In the background is a Comet tank, carrying a Forward Observation Officer, a Troop Commander, or a Battery Commander. The Hoverfly would carry a Gunner Officer.

Gloster Meteor T. Mk VII two-seat jet trainer with two Rolls-Royce Derwent Vs

Modern Trainers

...cival Prentice basic three-... trainer with D.H. Gipsy Queen.



...Paul Balliol ...r with Bristol Mercury.

DURING the war it became apparent that if an efficient all-weather defensive and offensive air force was to be built up it would be necessary to increase the scope of the standard flying-training programme and to introduce applied and instrument flying at the earliest practical stage. In addition, if extra aircraft and stages of training were to be avoided—and to-day for reasons of economy this is essential—new trainers would have to be designed to modern specifications so that more could be taught at each stage. Some provision had also to be made for training in the handling of gas-turbine-powered operational aircraft.

Several of the new-type trainers are now completed, as shown in these photographs. The R.A.F. basic and advanced designs are three-seaters, although the value of the third seat is the subject of controversy. All carry radio, full blind-flying panel and two-stage amber.

The Percival Prentice replaces the Tiger Moth and "first-part" Harvard in the schools. The Boulton Paul Balliol and Avro Athena take over from the Prentice and complete training up to what may be called a high O.T.U. standard. The prototype Balliol is flying with a Mercury piston engine, but Merlin and Mamba versions will follow. The Athena I is about to fly with a Mamba "propjet," and other variants with Dart and Merlin (Athena II) are under construction. For more advanced operational or squadron training the first Meteor two-seat turbo-jet trainer has been built. In addition to these there are, of course, the rather earlier Fairey Firefly trainers used by the Navy, and a two-seat trainer version of the Hawker Fury is on the way. Two other British trainers flying are the Spitfire two-seater and the Canadian D.H. Chipmunk. It is possible that the R.A.F. will find a use for the Chipmunk.

Avro Athena Mk I three-seat advanced trainer with Armstrong Siddeley Mamba. Beside the heading above is an impression of the Hawker Fury two-seat trainer with Bristol Centaurus XVIII.

Athena Advanced Trainer

Details of the Mk I Design with Mamba Airscrew-Turbine

THE prototype Avro Athena I is now ready to make its first flight from the company's airfield at Woodford, Manchester. Apart from its own importance as a new type of advanced trainer, it will also be of great interest as one of the first aircraft to fly with a single small airscrew-turbine as its power plant. Built to the specification T.7/45, the Mark I is very similar indeed to the Mk II prepared to meet the later specification T.14/47, the main difference being the substitution of a Merlin piston engine for the Mamba and a readjustment of wing position (and attachment) occasioned by the greater weight of the Merlin.

It seems probable that from cost, production and servicing considerations, the Mk II will be the design built in quantity, if a production order is placed, while a small number of Mk Is with airscrew-turbines may be built for delivery to appropriate units to enable the R.A.F. to gain experience with such power plants. It is not unlikely that the Navy would be interested to gain experience in the same way, although the original Naval requirement was withdrawn. Additionally, some foreign governments have in the past used advanced trainers for policing and other light operational duties, and the Athena will have an export appeal in its primary or in this secondary field. The present order is for one Mk I (Mamba) prototype, two Mk I (Dart) prototypes, and four Mk II (Merlin) prototypes. In addition, there is a small pre-production order which originally specified Mk Is but has been changed to Mk IIs.

A consideration of the requirements of a modern advanced trainer led A. V. Roe and Co. to study a low-wing design with buried engine, and cockpit well up in the nose. For various reasons, particularly range of c.g. travel, this idea was abandoned in favour of a more conventional layout with tail wheel. However, the chief requirements of such a trainer have been given first priority in preparing the design, and in addition to suitable flying characteristics the aim has been to provide a very good all-round view—particularly forward—from the cockpit; ease of entry and exit; convenient and comfortable seating and control arrangements; and, from the structural point of view, a sturdy airframe designed for ease of maintenance and inspection, and having all major components interchangeable. Such operations as a change of mainplane are simplified by confining all equipment and unavoidable complication to the centre section.

There is little doubt that the Athena I with gently tapering engine cowling and wing well back on the fuselage, is the more attractive of the two designs. To compensate for the Merlin's weight, the wing on the Mk II is 27 inches farther forward. The construction of the centre portion of the fuselage, and of the wing-attachment fittings, is such that this modification is of quite a minor nature, and should it be necessary, a conversion of Mk I to Mk II would be possible. To avoid interference from the dive brakes, the tailplane is placed forward and high, and the minimum of rudder area would be masked during spin recovery.

It is the intention of the Royal Air Force, with the aid of trainers built to the new specifications, to produce highly skilled pilots capable of handling the latest operational jet-propelled aircraft in all weathers, and to achieve this high standard without increasing the number of stages or types of aircraft required by the training syllabus. This can only be achieved by teaching more at each stage, and, in particular, by introducing applied flying instruction and practices as early as possible. The first aircraft built to the new basic specification is the Percival Prentice, and the Athena advanced trainer is designed to take over where the Prentice leaves off.

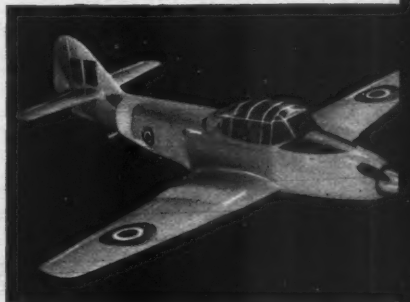
To accommodate comfortably a three-seat cockpit and all the equipment specified, the fuselage of the Athena needs to be large and wide; it has, nevertheless, been kept shapely. Advanced trainers are now required to carry rather more equipment than an equivalent operational machine.

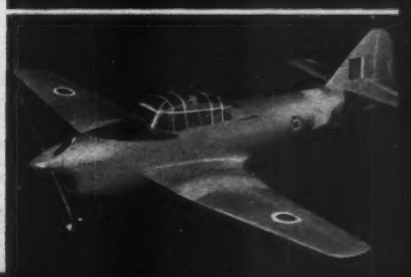
The Fuselage

The Athenas are constructed entirely of metal, and a structural description of the principal units follows.

The fuselage portion of the aircraft comprises four principal units: the main central section, the power plant with mounting and cowlings, the small tail section incorporating the fin, and the sturdy three-piece cockpit enclosure with power-operated canopy.

A double-skin fireproof (and thermally insulated) bulkhead separates the power plant from the cockpit. A sliding spring-loaded seal is provided for the jet pipe, which

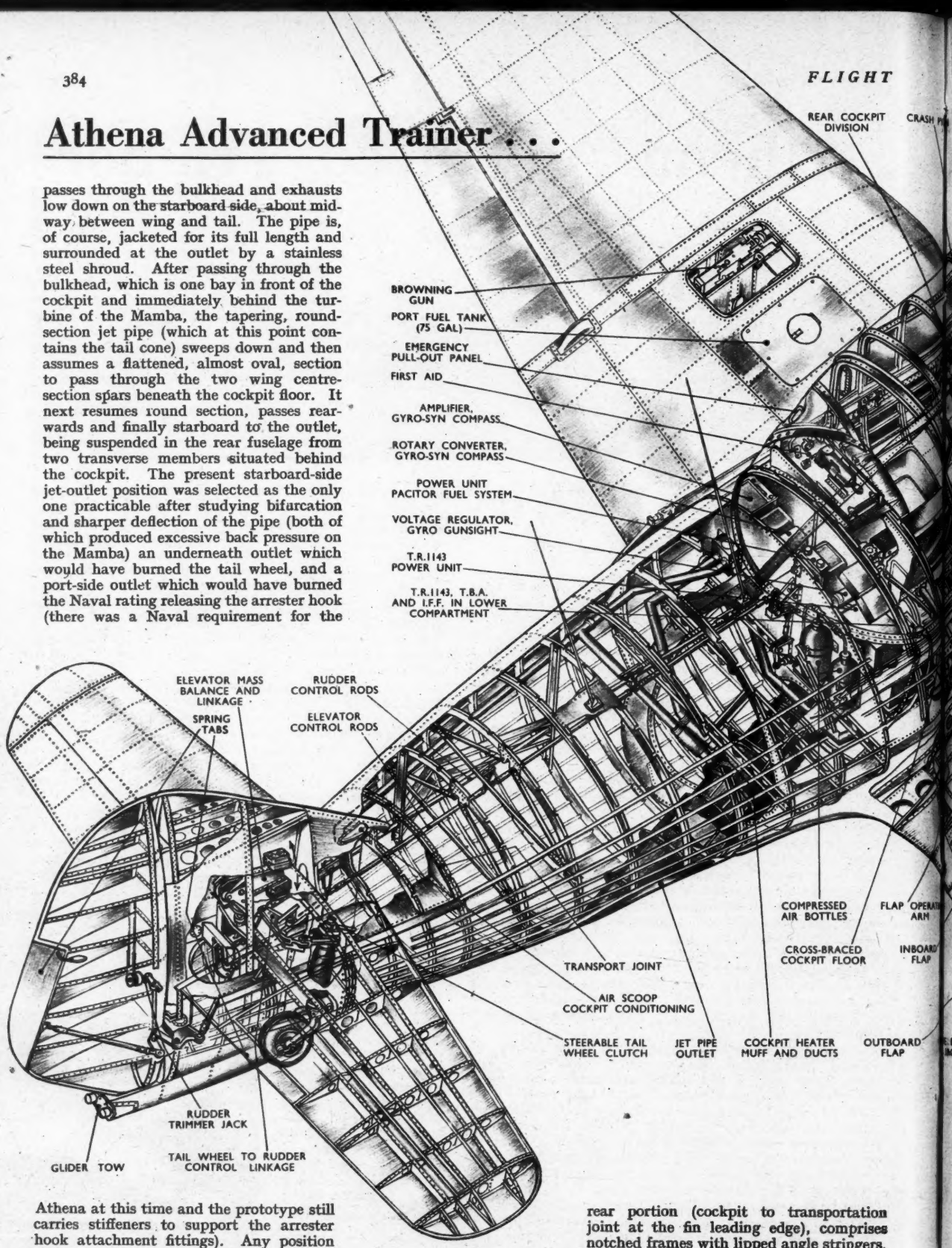




A comparison of the Mamba Mk I (above) and the Merlin Mk II. The Mk II wing is attached 27in farther forward on the fuselage.

Athena Advanced Trainer . . .

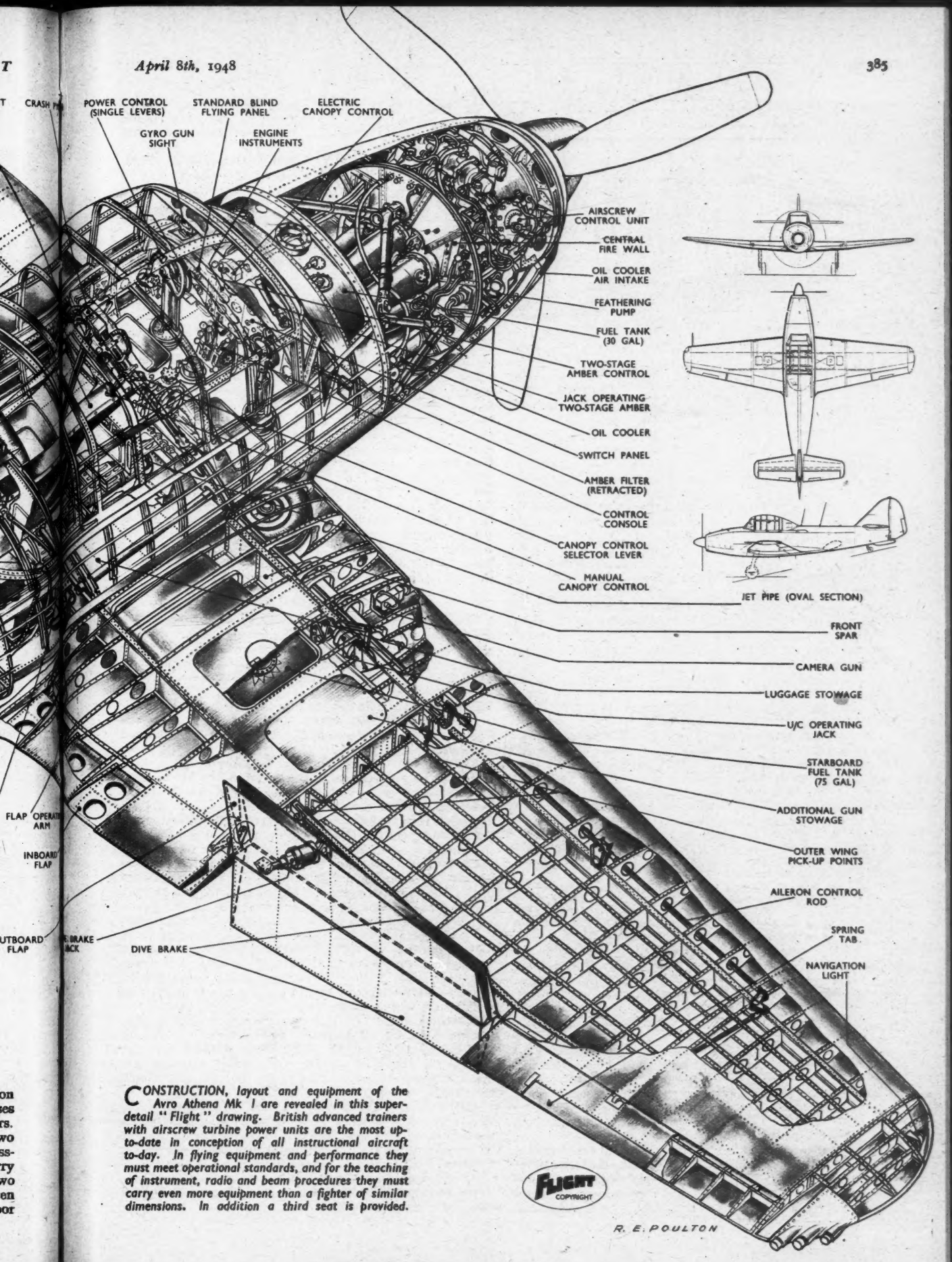
passes through the bulkhead and exhausts low down on the starboard side, about midway between wing and tail. The pipe is, of course, jacketed for its full length and surrounded at the outlet by a stainless steel shroud. After passing through the bulkhead, which is one bay in front of the cockpit and immediately behind the turbine of the Mamba, the tapering, round-section jet pipe (which at this point contains the tail cone) sweeps down and then assumes a flattened, almost oval, section to pass through the two wing centre-section spars beneath the cockpit floor. It next resumes round section, passes rearwards and finally starboard to the outlet, being suspended in the rear fuselage from two transverse members situated behind the cockpit. The present starboard-side jet-outlet position was selected as the only one practicable after studying bifurcation and sharper deflection of the pipe (both of which produced excessive back pressure on the Mamba) an underneath outlet which would have burned the tail wheel, and a port-side outlet which would have burned the Naval rating releasing the arrester hook (there was a Naval requirement for the



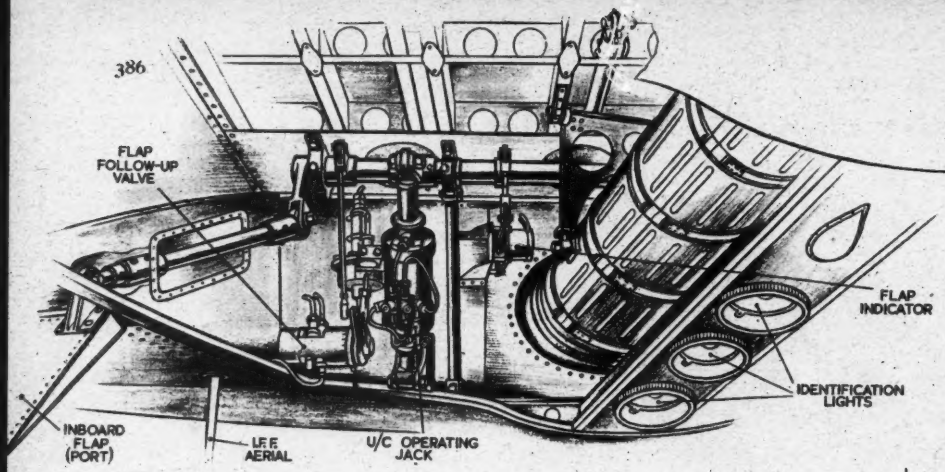
Athena at this time and the prototype still carries stiffeners to support the arrester hook attachment fittings). Any position high up in the fuselage would have caused burning of one or other of the aircraft's tail surfaces.

Although considered as a unit, the main fuselage is part conventional monocoque and part extension into a quite different type of structure for the cockpit. The fuselage is produced in left and right halves, divided vertically. The rear portion (cockpit to transportation joint at the fin leading edge), comprises notched frames with lipped angle stringers.

The cockpit section is built up round two heavy longerons at the top and a particularly rigid cross-braced floor structure, the side members of which carry the four wing centre section attachment fittings—two transverse and two fore and aft. Bending loads are taken by the four longitudinal fuselage members, while the floor



CONSTRUCTION, layout and equipment of the Avro Athena Mk I are revealed in this super-detail "Flight" drawing. British advanced trainers with airscrew turbine power units are the most up-to-date in conception of all instructional aircraft to-day. In flying equipment and performance they must meet operational standards, and for the teaching of instrument, radio and beam procedures they must carry even more equipment than a fighter of similar dimensions. In addition a third seat is provided.



Main flap jack and operating linkage in the centre section. The jet pipe is oval at this point.

Athena Advanced Trainer . . .

between bulkhead and rear spar acts as a horizontal shear member.

On the Mk I the lower longerons at the floor sides are continued rearwards by a large horseshoe member which passes under the jet pipe. This, and the double-up of the side skinning at the rear of the cockpit, helps to take the loads in the fuselage at this transition point. The remainder of the rear cockpit sides are of 14-gauge sheet, while the front skinning is 18 gauge, the necessary 20 gauge packing at the top longeron being turned over for attachment of the decking.

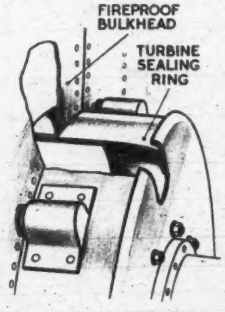
The structure extending from the engine bulkhead to the cockpit rear frame on the underside of the fuselage is deformable, and may be regarded as a keel for crash landings. It carries no flight loads.

The fuselage rear section and integral fin are constructed in a similar manner to the rear monocoque, and one heavy frame carries fittings for the tailplane front spar and for the tail wheel unit.

Rather unusual is the attachment of the one-piece tailplane which is threaded through the fin and pinned to four fittings, two transverse, two fore and aft, like those on the mainplane. This arrangement is desirable from the manufacturers' point of view, being good for lining up and interchangeability. The elevator mass balance is mounted on a lever anchored in a box within the fin structure, and connected with the elevators by a central crank and link.

For sturdiness and size alone the canopy for the three-seat cockpit is at once noteworthy. It must be one of the largest one-piece power-operated canopies to be produced. At the front edge it locks up to a magnesium alloy screen frame—itself an interesting example of casting. The sliding portion is jettisonable.

Sliding spring-loaded seal for the jet pipe at the fireproof bulkhead.



The Wings

The mainplanes are built around two spars with extruded and machined T-section booms and plate webs. They are produced in five units—centre section, two outer planes and two wing tips. The main units are bolted together with the aid of high-tensile fork fittings on the spars.

Pressed light alloy ribs are attached by angles to the spar webs, and where they coincide with the fuel tanks in the centre section, they are cut out to produce the tank cavities. The skin between spars in the centre section has spanwise reinforcement against flexing.

A great deal of attention has been given to the skinning of the mainplanes, and, in fact, of the whole aircraft. Wing skin is applied in large spanwise strips, the joints between them being reinforced and kept smooth by angle stringers. The large nose panel of the skin is wrapped round from a stringer on the under side at 15 per cent chord in front of the main spar (25 per cent chord) to the first stringer to the rear of the front spar on top, at 33 per cent chord. None of the skin joints correspond with a main spar in the outer wing and the skin is riveted direct to the ribs and booms.

Primary and secondary control surfaces occupy the full span of the wing trailing edge. The split-type flaps are in four sections, two of which occupy the wing centre section and two the outer wing roots. Overlapping the flaps on the outer wings are the dive brakes, and outboard again to the wing tips are the ailerons. The outer sections of the flaps move with the dive brakes, upon which they are carried, and only function as landing flaps when the dive brakes are closed. The linkage permitting this double movement is complicated to describe, and has therefore been made the subject of a separate diagram. It will be seen that the dive brakes open evenly above and below the wing, and therefore when they are operated in flight only the minimum change of trim occurs. Each dive brake flap has its own actuator. A single actuator with torque shaft, situated beneath the fuselage floor, operates the landing flaps through linkage to their inboard ends.

Aileron and Tail Surfaces

The ailerons, of Frise type, carry spring tabs to which are led the aileron controls, and through which, with the aid of a torsion spring, the ailerons are operated. Limit stops are provided against the failure of the torsion bar. The surfaces are mass-balanced, the hinge points being relatively far back so that a part of the balance is obtained without extra weight.

Aileron construction centres around the "D" nose box formed from a heavy nose skin and a channel-section spar. The landing flaps have a tubular spar of square section, and a skin is riveted to the ribs on the lower side only.

In construction, the tailplane resembles the mainplanes, but the front spar is cranked rearwards to follow the gentle sweep-back of the tailplane leading edge. The spars are flanged, heavy-gauge channels reinforced around their attachment points. The elevators have a single through-spar and a vee-form leading edge making up a torsion box.

The stiff preformed nose strip of the fin and other surfaces is added after the front channel and skin have been assembled. The thermal method of skinning is used for the tail surfaces, the 26-gauge panels being heated in the jig by lamps to about 80 deg C. Riveting is completed hot and the skin becomes stretched when cool, thus avoiding panting and quilting. This is a Hawker technique.

Trimming tabs on the tail surfaces are cable and screw-jack operated. The elevators carry a tab on each side, and the rudder trim operates by biasing of the fixed abutment of the spring servo tab.

Primary controls are operated through push-pull rods, and there is a slight difference in positioning of the elevator rods in the Mk I and II. The rudder control rods also operate the tailwheel steering arm through a tie-rod and link. A lever in the cockpit enables the pilot to declutch the steering linkage.

After careful study in mock-up form, the cockpit layout was approved by the company's pilots as well as by service departments. The arrangements generally provide freedom of movement and easy reach to all controls for either pilot. Essential engine controls are duplicated on the port side of the cockpit so that the machine has, in fact, full dual flying control. Control spectacles are fitted on the port side and a stick on the starboard.

Electrics are conveniently grouped on the rear side of the main bulkhead through which projects at an angle the Mamba jet pipe. Large hinged panels give access to this compartment.

A pedestal between the seats carries grouped engine and auxiliary flying controls. The blind-flying panel faces the first pilot (port side); engine instruments are centrally placed in the panel above the pedestal; while on the starboard side are located the switches and dials concerned with electrics and equipment—oxygen, gunsight, camera, bombs, brake pressure, etc. Certain controls and switches likely to be used only on the ground, or in emergencies, are found on a forward-facing panel between the seat backs. These include gun heating, master switches, and I.F.F.

Above this panel, accessible to all three seats, is the handle for manual operation of the canopy. The power switch for the canopy is on the coaming above the main instrument panels between gun sights. Here also is the control for the pneumatic jack which raises the three-section amber filter screens, and for the windscreen wipers.

Additional controls which deserve mention, are the glider release on the port side of the pedestal, the T.B.A. (tuneable beam) control just to the rear of the first pilot's throttle, and the V.H.F. (T.R.1143A) selector below the blind-flying panel. Map stowage is provided, and the cockpit is heated and ventilated. The intake scoop for the cockpit air is situated on the root of the fin, and a small duct leads either direct to the mixing valve or via a heater muff around the rear portion of the jet pipe.

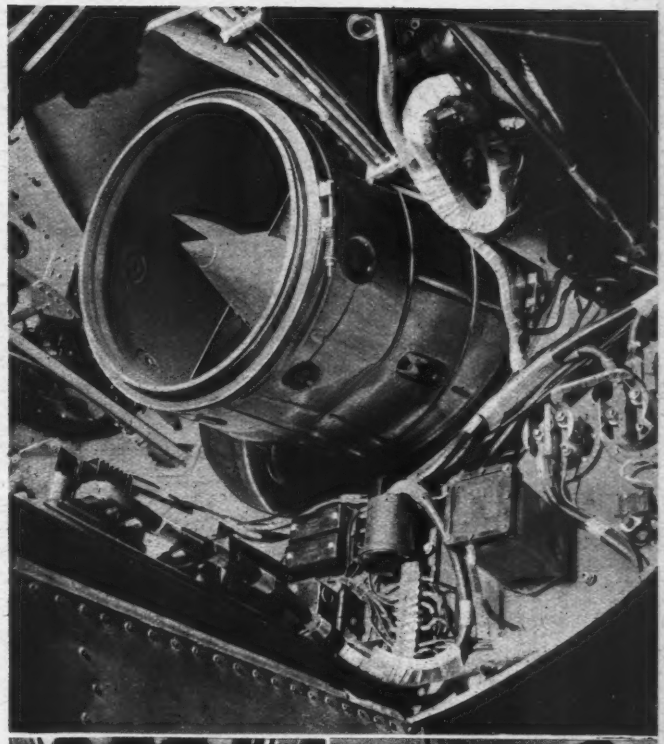
The passenger sits behind the first pilot, and is separated from the 18 cu ft of luggage space beside him by the crash-pylon rear bracing strut. Behind again in a separate compartment is stowed the radio and aids equipment.

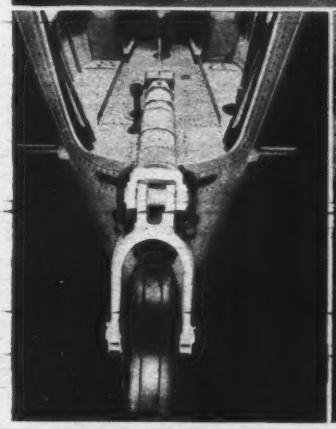
Maintenance

Maintenance and production are closely allied in so far as an aircraft designed for ease of production usually has some good maintenance qualities. Replacement of such components as mainplanes, wing tips or control surfaces, or even the complete tail, will be a simple matter on the Athenas, which have their separate units designed and produced for interchangeability. This is an important feature in a trainer. Control runs, pipe lines and other services which need frequent inspection, are grouped, or their key points are concentrated beneath inspection covers. For example, a lower panel between fireproof bulkhead and front spar gives ready access to all the control runs arranged neatly beneath the cockpit floor.

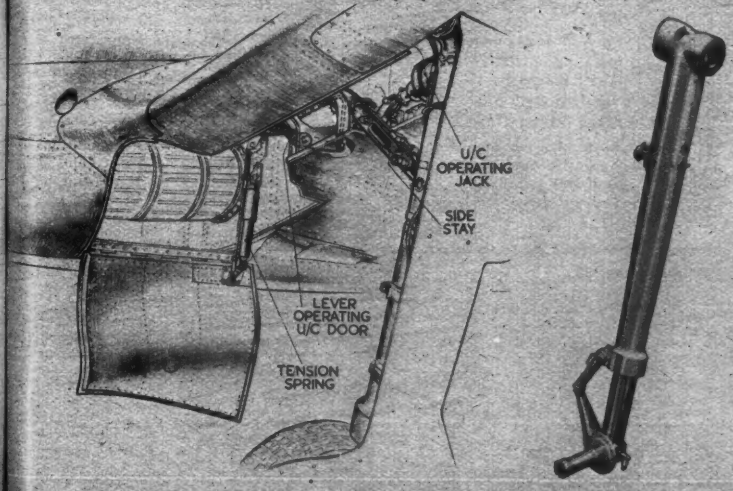
Fireproof bulkhead, cockpit floor and wing centre section need not be added to the main fuselage unit until late in the assembly operations. Thus installation of equipment, controls and instruments can go on unhampered with the front, top and bottom of the cockpit open.

A section of the skin forming the fin fillet and top of

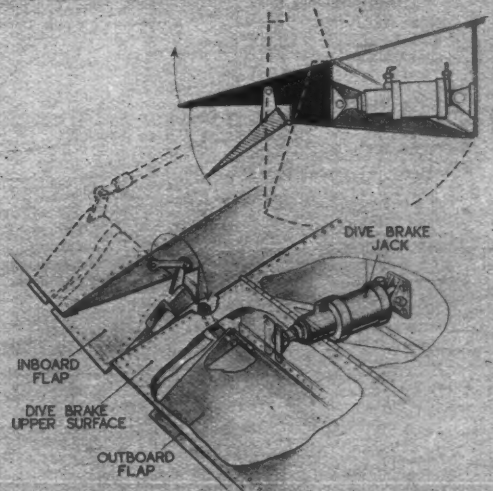


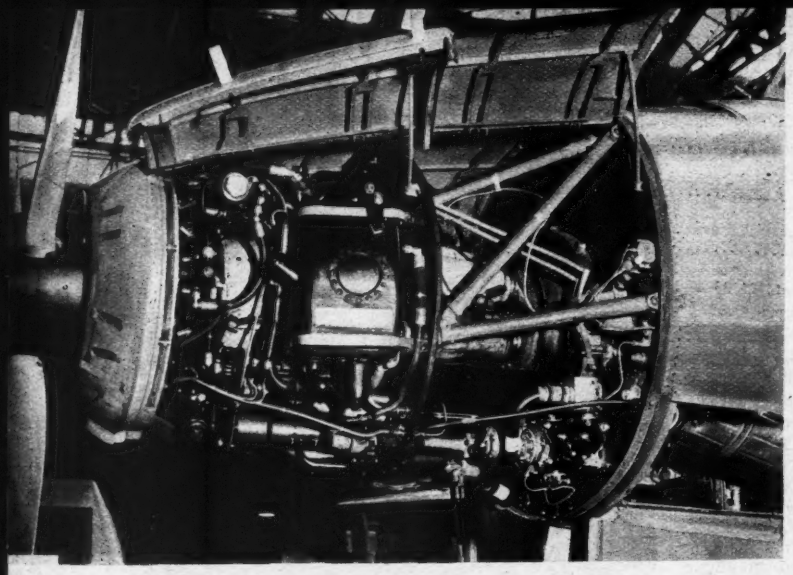


(Left) The inward-retracting main undercarriage and its mechanically linked door, and (centre) the shapely cantilever leg which is an Automotive Products design. (Right) Details of inner flap, and combined dive brake and outer flap operation.



(Above, left) The mounting of the Dowty tail wheel unit with steering link seen through the under-side inspection door. (Right) The two batteries are lowered from the wing centre section on a tray with the aid of cables and a small built-in winch.





Not only is the Mamba installation unusually neat and compact, but the four section cowling panels are so designed as to give excellent accessibility.

Athena Advanced Trainer . . .

the rear fuselage is removable as a panel to permit examination of the flying controls at this important point. Additional doors in the fin give access to the tailplane attachment fittings, and the tail wheel suspension and steering mechanism may be approached through a hatch in the underside of the fuselage.

Most of the complication is concentrated in the wing centre section which houses the main undercarriage members, main fuel tanks, Browning and camera gun (plus 300 rounds). Incidentally, the F.24 camera is mounted on the port side, aft of the rear spar. Access to pipe lines for the ancillary controls, and to electrical panels, is gained through detachable panels and from inside the wheel well.

An additional advantage of concentrating the equipment in the centre section, and, in particular, of retracting the wheels inwards and placing the fuel tanks well inboard, is to keep the rolling moment of the aircraft low. This and the provision of ailerons with an area of 8.8 per cent of the total wing area, should enable the aim of a rolling performance equal to that of a single-seater fighter of the same span to be achieved.

Alternative schemes have been designed for the operation of the undercarriage, flaps and dive brakes. One system is pneumatic, the other electrical, and they are interchangeable. The pneumatic system, which is the lighter of the two, is at present in use. The brake system, which has certain interesting features, is also pneumatic, and the total air supply comes from a Hymatic compressor charging two bottles to 1,000 lb/sq in. A parking brake is provided which locks the main wheels, and this avoids air loss if the rudder is moved. No emergency bottle is required for the wheels as they are lowered by gravity.

The main wheels retract inwards into wells in the centre-section leading edge, and when fully retracted they are totally enclosed. With the aid of a rod-and-chain system connected with each leg, the fairings are closed over the wheels in their wells by direct mechanical means. The pneumatic actuator retracts the cantilever legs by horizontal pressure exerted on a crank which causes the side stay to break and fold upwards.

Mamba Power Plant

The military version of the Mamba engine carries a special three-point mounting ring in order to conform to the interchangeability of power-plant requirement. This ring, which is approximately around the engine c.g. is supported on three triangles of tubular construction with attachment lugs on the main bulkhead. The cowling, of circular section, is made up of four 90 deg panels and a double-walled nose ring. The nose section forms the lead-in for the annular compressor air intake. Of the four curved panels, the upper and lower ones carry stiffened edges on which hinge and fasten the sides.

Between the front and main engine bulkheads, below the turbine, is mounted the remote accessory gear box which carries generator, compressor and vacuum pump.

Provision is made on the Athena for three internal fuel tanks and two drop tanks. The main tanks are of the Marflex "bag" type, holding 75 gallons each, and carried in the wing roots. A third similar tank of 30 gal capacity is located in the fuselage just ahead of the cockpit. The drop tanks are of 45 gal capacity. The main and drop tanks feed the central tank, air supplied from the pressure side of the vacuum pump being used to bring this about. The central tank which feeds the engine through an electric pump, holds sufficient fuel for 30 minutes flight.

DIMENSIONS

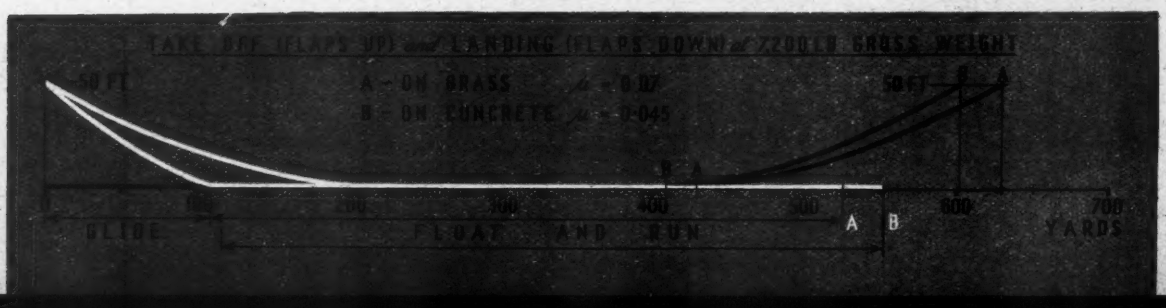
Span	40ft
Length	36ft 6in
Height, tail down	11ft 11in
Gross wing area	270 sq ft
Root chord	9ft 8.28in
Tip chord	3ft 9.72in
Wheel track	12ft 1in
Cockpit width at seat cushions	5ft 2in

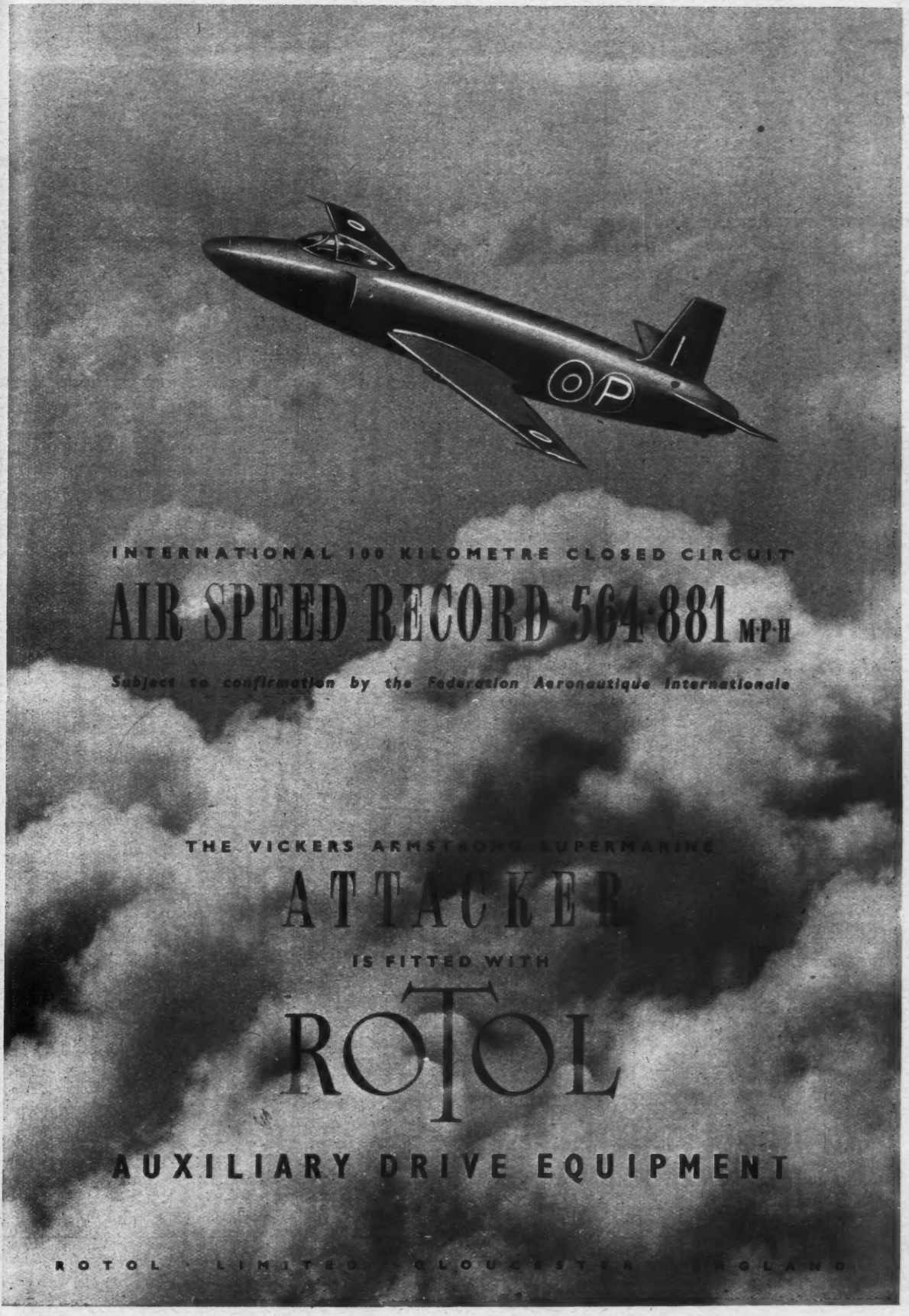
PERFORMANCE

Max. cruising at S.L.	249 m.p.h.
20,000ft	256 m.p.h.
Max. level at S.L.	282 m.p.h.
20,000ft	291 m.p.h.
Rate of climb, S.L.	2,640 ft/min
10,000ft (4.44 min to height)	1,890 ft/min
20,000ft (11.0 min to height)	1,220 ft/min
Estimated service ceiling	34,800ft
Consumption at 10,000ft : Max. level	80 gal/hr
Max. climb	68 gal/hr
Max. cruise	63 gal/hr
Stalling speed with flaps	80 m.p.h.
Stalling speed with no flaps	92 m.p.h.
Diving speed with dive brakes	325 m.p.h.

WEIGHT ANALYSIS

Fuselage	852 lb	11.9 per cent
Wings	1,083 lb	15.1 per cent
Tail unit	209 lb	2.9 per cent
Undercarriage	349 lb	4.8 per cent
Non-structural (engine and flying controls, seats and mounting)	187 lb	2.6 per cent
Power plant group (A. V. Roe)	369 lb	5.0 per cent
Power plant group (A.S.)	1,279 lb	17.8 per cent
Installation items (fuel system, etc.)	134 lb	1.9 per cent
Auxiliary services	105 lb	1.5 per cent
Total bare weight	4,567 lb	63.5 per cent
Fixed military load	500 lb	7.0 per cent
Total tare weight	5,067 lb	70.5 per cent
Removable military load (case C)	684 lb.	9.5 per cent
Fuel 180 gallons	1,440 lb	20.0 per cent
TOTAL LOADED WEIGHT	7,191 lb	100.0 per cent

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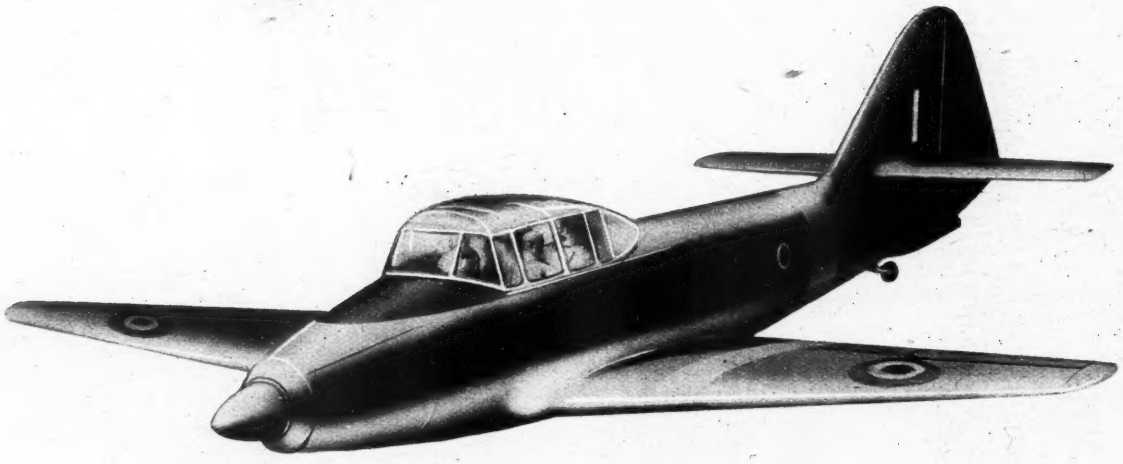

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The R.A.F.V.R.

Some Changes which would improve the Training Position

IT has been said that the R.A.F. Volunteer Reserve is not attracting sufficient numbers of pilots of the right sort and age. Many reasons have been suggested for this shortcoming, in particular the type of aircraft now used for training. However, it is debatable whether the first assumption is true, or, more correctly, whether the position could be otherwise. Recruiting has not been open to *ab initio* pupils, and the V.R. organization has scarcely had time to get into its stride. So long as ex-R.A.F. pilots up to a certain age limit are the only ones eligible as volunteers, the V.R. will continue to fill up mainly with "practically useless old men" of about thirty. The eighteen- to twenty-year-old boys, who are unquestionably the better material from which to build up Reserve Air strength, cannot as yet volunteer.

One way of assessing the degree of activity in V.R. circles is to turn up for training at the week-end without warning and try at short notice to get an aircraft (Tigers are still referred to by this name). At most schools this is no longer an easy matter. Another sign of the increasing interest in the V.R. is the spate of letters addressed to us, many of which have been printed in the correspondence columns. For every man who writes down his opinions, it is fair to estimate that at least a dozen others have thought about doing so.

The feeling on *Flight*, particularly of the V.R. pilots on the staff, has naturally been very sympathetic to the "let's have a more interesting aircraft" plea, but it is not easy to add weight to these prayers. The problem is not one of what types of aircraft would be desirable, but a three-fold consideration of: What aircraft are available? Who would look after them and provide spares? And, even more important, where is the money coming from to pay for them and to operate them?

Money and Manpower

Most people interested in these matters will have watched the latest Service Estimates through the House, and many will have been a little alarmed at the meagre provisions made under some of the most vital headings. Obviously, additional sums are unlikely to be devoted to Volunteer Reserve training when first-line purse strings are as taut as a Tiger bracing wire. Nor is it true to suggest that there are plenty of Harvards, Oxfords and the like available for operation by the V.R. schools, assuming that someone could be found to foot the bill.

Many skilled ground engineers are needed to unpack what aircraft are held in reserve, and to make them serviceable. Certain of the civil V.R. schools might then be able to keep a few such aircraft serviceable, but by no means all of them have sufficient qualified manpower, and any inequality of equipment at the schools would be likely to lead to an even louder moan than the present ones over Tigers, and the comparison between the present R.A.F.V.R. and R.N.V.R. equipment.

In the months between now and the time when the equipment problems have been sorted out there are, however, a number of things which might well be done. As a first move, all canteens at airfield centres should be transformed as nearly as possible into R.A.F. messes and the best sort of R.A.F. spirit fostered. The difference between a Reserve, a training and an operational squadron airfield in peacetime is in the spirit, interest and outlook of the pilots, the type of aircraft being relatively unimportant. Secondly, the flying that is done on Tigers by fully qualified pilots should be made as useful as possible. For example (a personal one), a V.R. pilot who was a qualified elementary instructor in wartime (and there are a number of them) should not be asked to sit in the back seat of a Tiger with front controls removed to give a rather bored A.T.C. cadet his eleventh session of air experience; using, incidentally, a battered pair of Gosport tubes and helmets through which the boy can hear practically nothing. The A.T.C. cadet should be well on his way towards a first solo and an "A" licence by his eleventh flight. A potential pilot volunteer for regular service would by then have received proper encouragement, and a V.R. pilot would feel he had made a worthwhile flight. Extra cost—nil.

Old Men or Children

There is a tendency to suggest good-naturedly to the present V.R. pilots (who are mostly in the "late 20s" or over) that they are "old men" and it is only the young ones who will be useful. Yet in the next breath the old men's experience is forgotten, and they are pushed around like kids. Either the majority of V.R.ists are responsible, qualified pilots, or they are not. This is a second matter needing attention at the present time. Without pretending to know the answer, it should also be mentioned that the position, regarding the wearing of uniform, is not entirely satisfactory, nor is the interpretation of the present rulings consistent throughout the schools.

It is recognized that the most economical method of training pilots known at the moment is to put the courses through the so-called civil schools, as was done before the war; that is, for the R.A.F. to sub-contract the pupils during early and intermediate stages. This method might well be reintroduced in conjunction with the V.R. schools, to the advantage of all concerned.

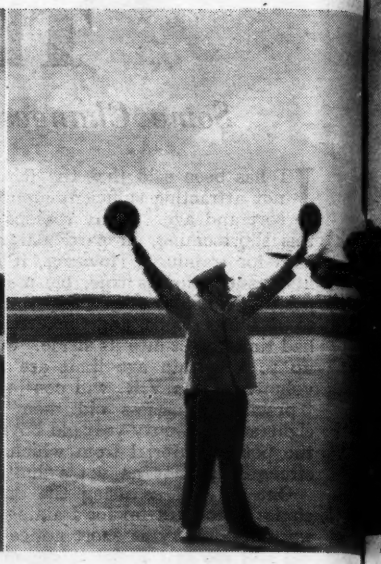
Another suggestion worthy of consideration is that recruiting should be commenced for V.R. ground crew from amongst demobilised wartime fitters and riggers. In this way there might be built up a pool of trained men of vital importance in the event of another war, and at the same time the servicing problems associated with additional and more advanced V.R. aircraft would be settled. Presumably the snag here would again be the Treasury, for men likely to volunteer would rightly expect a reasonable reward for their spare-time services.

Finally, there is a legitimate grouse about transport, one which in spite of efforts towards fuel economy needs to be removed. At week-ends a crew bus or station wagon is required to run to a regular schedule between airfield centre and railway station. Only a minority of trainees own or have motor vehicles on the road, and although some official transport is available, many men decide against turning up for periods of week-end training because, once they have arrived at the airfield, they are stuck there for the day, unless they are prepared for a five-mile walk. As the evenings get light, transport will also be one of the main considerations for a man deciding whether or not to report for after-work week-day training.

BOOK REVIEW

Molesworth's Aeronautical Engineers' Pocket Book. E. and F. N. Spon, Ltd., London. 30s.

IN his preface to the Second Edition of this work, the Editor, Dr. A. P. Thurston, M.B.E., D.Sc., M.I.Mech.E., F.R.Ae.S., F.C.I.P.A., states that he has "possession of a very great quantity of additional material, so modern that it has not been released in time for inclusion in the present volume." This, however, should deter no one from purchasing the current issue. It is by far the most complete compendium of data and explanatory information for the aeronautical engineer that has ever been produced. The first edition, published in 1942, was something new in this particular field, but suffered from a variety of defects: the second edition is free from the shortcomings of its predecessor, and is immoderately enlarged in content, although not in size. Many of the illustrations have been over-reduced, however, and thus their primary purpose is partially defeated.



TARMAC CONTROL

Systems Employed in Marshalling Aircraft at London Airports

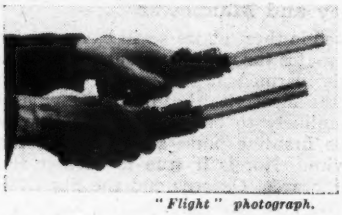
TO most airline passengers the landing signifies the end of a flight, and manœuvres on the ground are casually dismissed as automatic routine. The marshalling of airliners at a busy airport, however, has a direct bearing upon quick and efficient turn-round and the safety of passengers and aircraft. Future plans for airport buildings, although still vague, will undoubtedly include permanent bays for loading and off-loading, in which covered-in passenger gangwalks are a feature. Until such plans materialize, however, the well-known wide tarmac must suffice for parking aircraft at many airports in the U.K. and overseas. The international airport at La Guardia, New York, is already provided with covered passages above ground, leading to the aircraft, and from the elevated control tower the captains of aircraft are directed by R/T on arrival. With such facilities, the handling of aircraft is comparatively simple, but until similar facilities can be incorporated in British airports, tarmac marshalling will remain an important phase in the handling of services.

London Airport

Where an open stretch of concrete is employed, it is the usual practice to park aircraft in the pattern most suitable for the handling of passengers. It is inevitable, however, that at rush periods some positions will be more favourable than others. At London Airport, B.O.A.C. were originally responsible for the allocation of permanent parking positions, but after May 1st, 1946, the Ministry of Civil Aviation took over that responsibility, and the system of "first come first served" was adopted—always bearing in mind the aircraft load, time for turn-round, and general handling considerations. At London Airport the passenger-handling buildings lead straight on to the broad tarmac which accommodates eight 4-engined aircraft in a line alongside the perimeter track, and a greater number of twin-engined aircraft in a second row.

A Dakota is allowed to occupy a position on the tarmac for only 1 hour, Yorks and Lancastrians 1½ hours, and Constellations 2 hours; for aircraft remaining longer than that time for a turn-round, a portion of the perimeter track has been specially allocated for parking. For longer periods, and for overnight stops, part of the No. 4 runway is used. Since March 1st of this year, the M.C.A. has, after some initial opposition from the operating companies, taken over full responsibility for marshalling aircraft, and from a Control Room overlooking the tarmac Mr. F. W. G. Harbor (M.C.A.) controls and logs all arrivals and departures, allocates positions and controls his staff, which consists of a marshalling superintendent, one charge hand, and three marshals to signal the aircraft in and out.

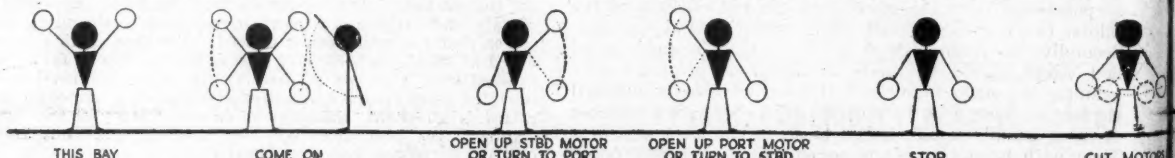
Although there are many regulations to keep the tarmac clear of unauthorised persons and vehicles, and to limit the speed of surface vehicles for the safety of passengers and aircraft, it is only through liaison between the Controller, the company officials, passenger-handling and other staff that smooth running can be achieved. An example of the dangers to which passengers may be subjected was provided during a recent visit, after the arrival of a DC-4 belonging to South African Airways. The newly arrived aircraft was parked at a distance from the arrivals building, and passengers were expected to walk some 300 yards after disembarking. B.O.A.C. were responsible for the passengers, who were permitted to straggle across the tarmac between the aircraft and the buildings while, incidentally, a bus stood by for the crew. As they passed behind a Lancastrian its engines were started, to the great consternation and discomfort of about a dozen women and children. Only careful organization and liaison can avoid such unfortunate occurrences.

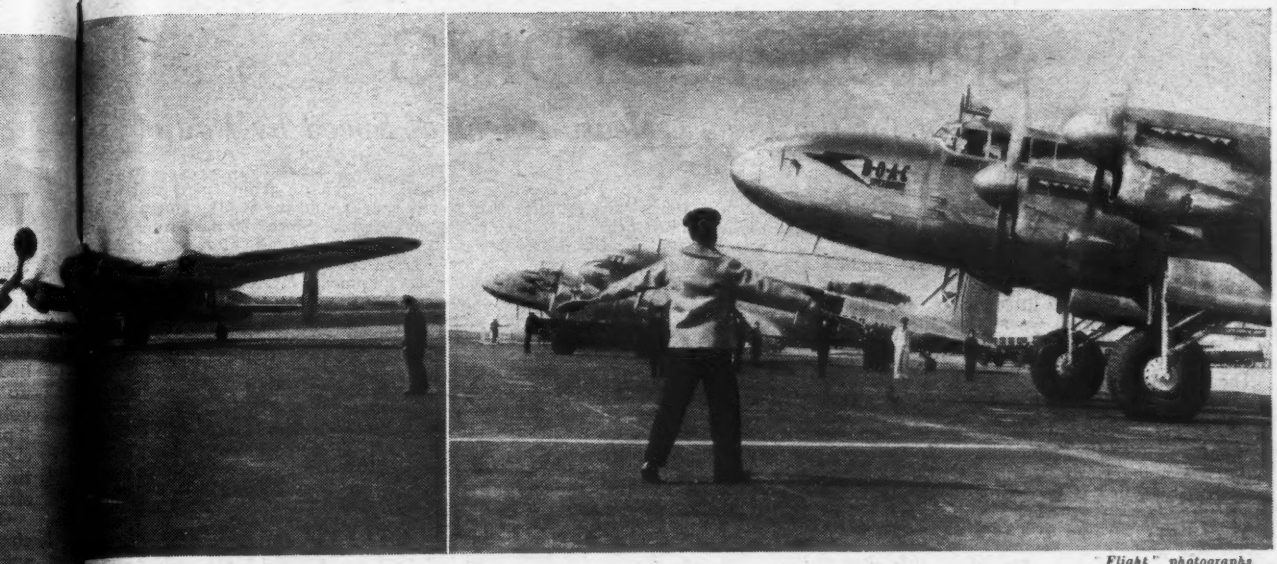


"Flight" photograph.

Special illuminated wands are used for giving marshalling signals at night.

In present conditions there are several problems which make control difficult: the Control Room is temporary; communications to other departments are inadequate; other users, including the airfield constructors, casually drive across the tarmac; B.O.A.C. are using heavy lorries for loading instead of light trucks in train; and there are several companies handling pas-





"Flight" photographs.

Three stages in marshalling a B.O.A.C Lancastrian into position at London Airport. In the extreme left the marshaller is indicating "this bay." In the centre, he has turned in order to indicate to the captain of the Lancastrian that he is to manoeuvre and ultimately face the marshaller; and on the right he is giving the signal "cut motors."

"Flight" photograph.

In the Control Room at Northolt. The Traffic Controller is receiving a message on the inter-office loudspeaker, while the Tarmac Controller enters information on the board. The Tannoy announcer, seated behind the Controller, makes announcements to passengers from the booth at the back. The Deputy Station Superintendent, B.E.A., Mr. T. Le Praik, is seen talking on the telephone.

sengers in their own way. During last month, the M.C.A. handled nearly 3,000 aircraft on the tarmac.

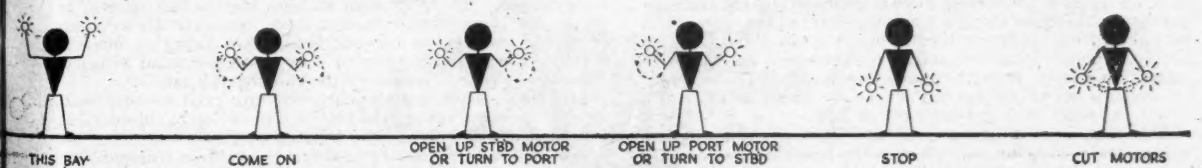
B.E.A.C. Control at Northolt

At Northolt the system is somewhat different: British European Airways have made themselves responsible for the handling of all passengers and aircraft, except those of only one company, and from personal experience passenger handling runs more smoothly. From a Control Room alongside the tarmac, the Traffic Controller has complete control over aircraft and passenger movements on the ground; he is connected with all services responsible for attending to the aircraft during turn-round and to the passenger-handling sections. The tarmac can hold 15 twin-engined passenger aircraft and 20 or 30 freighters. Only 1½ hours is allowed for each aircraft on the tarmac.

The system can be more easily followed by a typical example: When an incoming aircraft is signalled out from its departure point, Operations inform the Traffic Controller, and he is also informed of any change in the E.T.A. at destination. When the aircraft enters the circuit, the Controller is informed by Air Traffic Control, and a broadcast goes out to all the services by Tannoy and inter-office loudspeaker. On arrival at the tarmac the aircraft is signalled into a position already allocated by the Traffic Controller, and the passengers are attended to by the B.E.A. staff. For outgoing services the aircraft must be in position one hour before departure. As each service is completed (that is, when the maintenance party has finished the check, the refuellers have topped-up, the aircraft papers have been completed, and freight has been loaded), so the Controller is informed, and when the coach is reported to have arrived, he is then in a position to know whether the aircraft is ready to leave. Under his orders, passengers are directed to the waiting hall or into Customs or, in the case of internal services, straight to the aircraft.

During March the staff, with one marshal and one Tarmac Controller always on duty, handled about 2,500 aircraft, and traffic frequency will gradually increase as the summer schedules take effect. British European Airways alone this summer will have scheduled services flying into Northolt at the rate of one every six minutes and flying out at one every three minutes, during peak hours.

A smoothly running tarmac control and passenger-handling organization is obviously necessary, and B.E.A. have already produced a simplified passenger sheet for saving time and labour, but it remains to be seen whether there are any bottlenecks this summer, especially in the Customs section.



SPEED RECORDING

New American System for the Precise Measurement of Speed by Radio

UNTIL fairly recently, the measurement of aircraft speeds did not involve much difficulty. Certainly, speed is a relative quantity, but the precision of surveying methods and the rapidity with which time-recording mechanisms can be operated has, up till now, been enough for flight speeds to be measured with an adequate degree of accuracy. Jet and rocket propulsion have, however, lifted aircraft maxima, both of speed and altitude, to such an extent that the precise measurement of speed by orthodox means has become not only physically more difficult, but also subject to greater relative error.

The U.S. Army Air Forces have evolved a method whereby speed can be measured at all altitudes up to about 60,000ft to within cumulative errors of less than 0.5 per cent. A comprehensive description of the system appeared in an article by Charles S. Franklin, published in the February issue of our U.S. contemporary, *Electronics*. Basically, the system comprises two modified instrument-landing beams through which the aircraft flies, airborne radio equipment sending a signal at the instant of passage through each beam, to a ground receiver incorporating an electronic timing mechanism. The official title of the system is "all-altitude speed course."

The ground equipment consists of two radio transmitting sets, similar to instrument-landing system (I.L.S.) beam transmitters, which were designed originally to serve as multi-frequency instrument-landing localizers. Each set is essentially a radio transmitter and a radio frequency radiating system, the desired frequency being obtained by inserting an appropriate crystal unit and retuning the transmitter circuits. These two beam transmitters provide the "sheets" of signals through which the aircraft flies on a course perpendicular to them.

A course monitor unit is placed on the surveyed azimuth line at a distance of 400ft from the transmitter, and this method of directional control is sufficiently accurate to maintain the beam position to within ±8ft at a distance of twelve miles from the transmitter.

It is, of course, equally important in an "all-altitude" system that, in addition to directional parallelism, accuracy shall be maintained in the vertical plane. The initial azimuth adjustment is made by lining-up each of the beam transmitters with their respective course monitors. While this method alone results in a good approximation, it is not sufficiently accurate, nor is there any proof of exact course alignment in the region where it is to be employed.

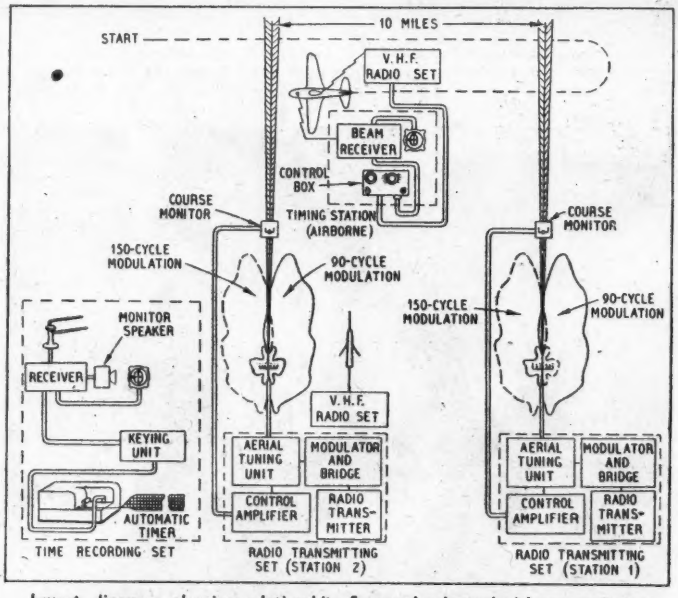
A satisfactory method of checking both azimuth alignment and vertical lean is by means of airborne flash-tube equipment and a zenith camera located at surveyed ground positions. The flash-tube can be triggered on and off, depending upon the position relative to the course of the aircraft in which it is carried. The zenith camera provides an accurate method of recording the triggered light flash and computing deviation from surveyed ground positions. The flash-tube provides a high-intensity flash having a duration of approximately 200 micro-seconds.

The Zenith Camera

A zenith camera, as its name implies, is one designed to photograph objects directly overhead. It employs a 24in f/6 camera objective, and records the image on a 4×5in plate. The camera can be levelled precisely to an accuracy of the order of one second of arc by means of a mercury-pool artificial horizon reflecting an image of a cross-wire in the levelling eye-piece formed by an optical collimating system. On each photographic plate an image of these cross-wires is impressed by the collimating system to define the exact optical centre of the plate. This optical centre is stationed directly over the Coast and Geodetic surveyed point, located exactly on the course and approximately 12.5 miles from the beam transmitter. The accuracy of measurement of position of the airborne flash-tube at an altitude of 10,000ft is of the order of two feet.

The aircraft carrying the flash-tube unit is equipped with an automatic coupling unit between the beam receiver and the automatic pilot, thus making it possible for the aircraft to be kept exactly on course or slowly to oscillate about this position. The test aircraft is flown at night, and the zenith camera shutter is kept open during each flight. Since the flash-tube unit operates only when the aircraft is exceedingly close to the on-course position, it follows that a centre-line drawn through the recorded dots on the photographic plate represents the actual position of the on-course signal in space.

Azimuth alignment is accomplished by determining the true position of the beam signal in the manner described, then shifting the course until its position coincides with the surveyed position. Zenith-camera photographic plates are developed in the field, course deviation is quickly computed, and this information transmitted by radio to the beam transmitter, where the course is shifted the desired direction and amount. The course monitor aerial, located 400ft from the beam transmitter, is then moved to this established line-of-position and is henceforth used as an electronic bench-mark to maintain azimuth alignment. Once the azimuth alignment is determined at the initial altitude of 5,000ft, the test aircraft makes passes at successive altitudes up to its ceiling. Zenith-camera records of these flights, plotted against altitude, determine course lean.



Layout diagram showing relationship of ground units and airborne equipment employed for the All-altitude Speed Course.

Making a test run on the speed course is a comparatively simple operation. The pilot first sets the channel selector on the control box to correspond with the frequency of the first beam to be crossed. After the test aircraft has reached the desired altitude, the pilot communicates with the ground operator at station 2, announcing the first run. He then switches over from Communication to Speed Course; as the aircraft crosses the first beam on a heading of 90 deg to that of the beams, the ground chronograph will be automatically triggered and both the airborne and ground visual indicators will move from one side to the other, indicating that the first beam has been crossed. The pilot then changes the channel selector to the second beam which, when crossed, automatically keys the recording chronograph a second time. Two passes are made in opposite directions in order to compensate for wind velocity. The elapsed time is read from the chronograph tape.

Although several possible sources of error exist in the present all-altitude speed course, the total errors add up to considerably less than 0.5 per cent. The heading of the aircraft over the course will not be exactly as desired, but it is reasonable to assume that its direction may be held with less than a 3 deg

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Speed Recording . . . . .

variation. Any heading other than that which is perpendicular to the direction of the two beams will result in flying a longer course than that for which the speed is computed. Computed speeds will be lower than actual speed, and will vary with heading as follows:—

HEADING VARIATION	ERROR IN COMPUTED SPEED
1 deg	0.015 per cent
2 deg	0.061 per cent
3 deg	0.137 per cent
4 deg	0.244 per cent
5 deg	0.381 per cent

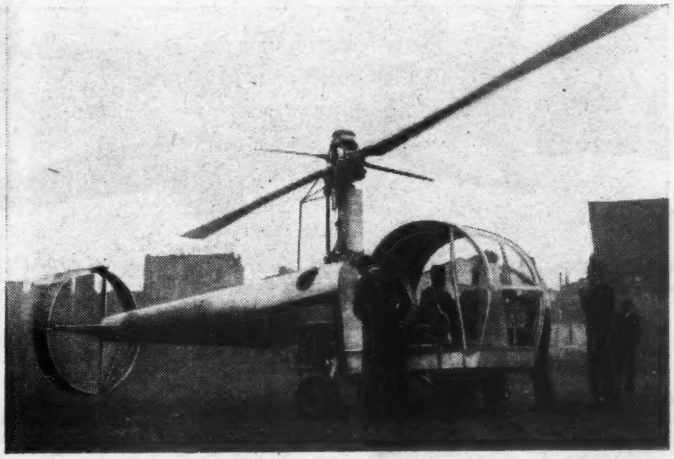
Distance between the two beams has been determined by a Coast and Geodetic survey which is accurate to one part in one million. Because of curvature of the earth, the two beams are not parallel, but spread apart slightly as a function of altitude and beam separation. On the basis of a 10-mile beam separation, this spread with altitude amounts to 151ft at a height of 60,000ft. The beams are aligned and maintained to within ±5oft at a distance of 12.5 miles from the transmitter. On the basis of a course-run of 10 miles, and both beams off the maximum amount in opposite directions, this error amounts to 0.190 per cent. The error introduced by chronograph timing is ±0.008 second. On the basis of a speed of 600 m.p.h. and a course-run of 10 miles, this error is 0.0133 per cent, which is negligible. Using maximum errors that can be reasonably assumed, such as 3 deg variation in heading, beam alignment in error by 100ft (two beams off in opposite directions) and a 0.008 second timing error, the maximum error on a basis of 600 m.p.h. and a run of 10 miles is 0.34 per cent. The probable error is less.

The all-altitude speed course is now in operation in the vicinity of Wright Field, and a second installation is scheduled for Muroc Army Airfield, California. These facilities are to be available to all branches of the armed services as well as institution activities, such as the N.A.C.A.

THE NORD 1700 NORELIC

French Helicopter with Unusual Features

THE S.N.C.A. du Nord, in common with other sections of the French nationalized aircraft industry, has a number of interesting aircraft in project and prototype stages. The concern has recently completed a helicopter known as the Nord 1700 Norelic, which is at present undergoing flight tests. The first flight of the Norelic was made on November 17th at Issy-les-Moulineaux, and the helicopter is of single two-bladed main rotor configuration, with a small auxiliary rotor. An unusual feature of the design is that it incorporates a pusher propeller running in a guide cowling or shroud. This feature, in addition to providing some forward propulsion, is claimed to counteract torque reaction by means of its airflow effect on a series of large tail fins or vanes attached to the shroud. The shroud eliminates the risk of injuries sustained by persons inadvertently walking into the rotating propeller. Construction is of all-metal monocoque type, and the Norelic provides side-by-side seating for two persons.



The research prototype of the Norelic helicopter.

The first prototype, depicted in the accompanying photograph, is intended primarily for research purposes in determining the features desirable for the subsequent production model. The cockpit enclosure of the prototype will eventually be replaced by one of cleaner design, and somewhat reminiscent of that of the Bell Model 47; and the complicated rotor head will be enclosed in a neat fairing.

The manufacturers claim that in the event of an engine failure, and the subsequent disconnection of the power transmission, the Norelic offers a considerably lower sinking speed than many contemporary types The estimated performance of the Norelic when powered by a Mathis G7R engine developing 160 h.p. at 3,100 r.p.m. is: Maximum speed, 115 m.p.h.; cruising speed at 75 per cent power, 96.3 m.p.h.; maximum rate of climb, 1,056 ft/min; range, 248.6 miles; maximum hovering ceiling, 5,000ft; maximum ceiling, 9,842ft.

AMERICAN AIRCRAFT GAS TURBINES

IT is frequently stated that this country is well ahead of all others, including the United States, in the development and production of aircraft gas turbines. We believe this to be true, and facts recently published in America, the only country which offers important competition in this field, seem to confirm the statement.

In a recent review of the gas turbine position in America, our contemporary, *Aviation Week*, points out that the two major producers of military engines for World War II are not turning out jet engines for service. These companies, the Pratt and Whitney Aircraft Division of United Aircraft Corp. and Wright Aeronautical subsidiary of Curtiss Wright Corp., were not in on the early development of jet engines because all of their engineering and manufacturing facilities were devoted to piston engines. It seems that they are now spending about 30,000,000 dollars in an effort to catch up on jet development. The only company which now have jet engines in quantity production is the Allison Division of General Motors Corp., and their production engines were originally developed by the General Electric Company, a non-aviation concern.

About this time last year Pratt and Whitney began tooling up for the production of the Rolls-Royce Nene, following a remarkably successful passing of the U.S. Navy's 150-hour type test by one of these units. An important new Navy fighter, the Grumman XF9F-2, is now flying with a single Nene for power. Reports on the behaviour of Nenes in America during the last year have been excellent.

A word on definitions is also contained in *Aviation Week* suggesting that in addition to the family name of "gas turbine" the three more common varieties should be called "turbojet," "turboprop" and "turboramjet." A turboramjet is a turbojet with after-burning.

Manufacturer	Model	Type	Compressor Stages	Turbine Stages	Thrust lb S.L. static	s.h.p.	r.p.m.	Spec. fuel consumpt. lb/hr/lb thrust	Overall length (in)	Overall diam. (in)	Weight lb
Allison Div. of General Motors ...	J-22-A-33	C	1	1	4,600	—	11,750	1.12*	103	50.5	1,735
	J-35-A-15	A	11	1	3,750	—	7,700	1.075*	145	37.5	2,425
General Electric ...	T-31-GE-3 (TG-1008)	AP	14	1	500	1,900	13,000	0.768	114.5	35	1,984
Westinghouse Electric	J-30 (19XB-2B)	A	10	1	1,600	—	17,000	1.15	94	19	718

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FROM ALL QUARTERS

PATHFINDER BALL

AT least six hundred P.F.F. types and their partners met at the Dorchester Hotel last Saturday, April 3rd, on the occasion of the annual Pathfinder Ball. Air Vice-Marshal Bennett was present, and although speeches are out of order on these occasions, the guests were as usual informally welcomed by "Doc" MacGown. Prizes were presented by Miss Anne Crawford, one of several film star guests.

FIRST RUN OF CHINOOK

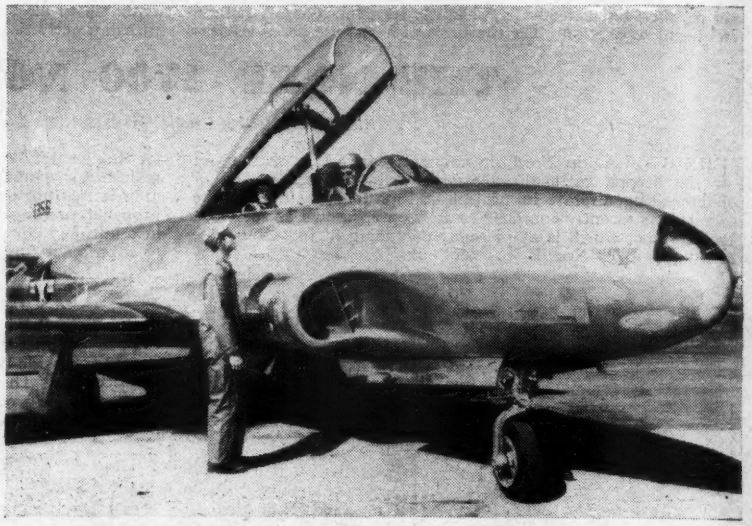
SOME preliminary details of Canada's first turbo jet, the Avro Chinook, and a summary of its development and background were given in the January 22nd issue of *Flight*. News has now been received that the Chinook prototype has run for the first time, though at what percentage of its full designed power of 2,590 lb thrust at 10,100 r.p.m. is not stated.

The Chinook is of straight-through design, the air intake for the axial-flow compressor being around the intake cone or "spinner" and the outlet feeding directly through the six combustion chambers to the single-stage turbine. Preceding the compressor is a cast light alloy intake casing containing inlet guide vanes. The first two stages of compressor blades are of stainless steel, and the remaining seven of aluminium alloy. A compression ratio of 4.5:1 is achieved.

The compressor rotor is supported in a self-aligning plain bearing at the one end and a duplex-type ball bearing in a self-aligning housing at the rear. The six combustion chambers discharge into a fabricated nozzle box and through cast chrome-cobalt nozzle guide vanes. The front end of the turbine shaft is connected to the compressor rear shaft through a flexible coupling designed to compensate for angular misalignment. The accessory equipment—two variable-delivery positive-displacement pumps, flow-control unit, pressure-regulating valve, six burners and two torch igniters, are provided by Joseph Lucas, Ltd.

OBITUARY

WE regret to announce the death, as a result of a motor accident, of Capt. Thomas Elliott Laing, who was from 1941 manager of the Airspeed shadow factory at Christchurch. After serving as a pilot in the R.F.C. during the 1914-18 war, Capt. Laing spent a number of years in Canada and America where he did a considerable amount of flying and was chief electrical engineer with one of the Canadian railways, and later in the Ford works at Detroit. In 1931 he became works manager and a founder member of Airspeeds and, after the company moved from Yorkshire to Portsmouth, Capt. Laing became chief engineer, until his appointment to Christchurch, which he held until the time of his death.



SHOOTING STAR TRAINER: A comparison with the Gloster Meteor Trainer (see "Flight" last week) is afforded by this view of the Lockheed TF-80C. The fuselage is lengthened by 38 inches to accommodate the two seats in tandem.

MEASURING THE ALTITUDE RECORD

Major R. H. Mayo, official observer of the altitude record for the F.A.I., is seen signing a card which was photographed on the film carried on the Ghost Vampire, thus authenticating the instrument readings on it. With him (left to right) are Col. R. L. Preston, Secretary-General of the Royal Aero Club, also an official observer, and Mr. S. E. Caliendi, chief instrument engineer of the de Havilland company.

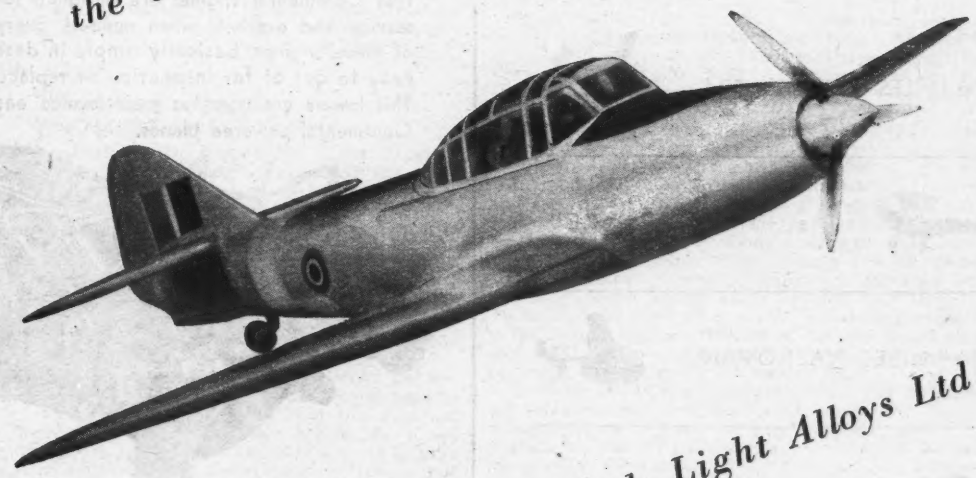
AS indicated last week in the description of John Cunningham's altitude record and the Ghost Vampire which he flew, measurement, with the requisite degree of accuracy of the altitude attained, presented a major problem. For the purpose a modified version of the standard flight-recording equipment was installed in the gun compartment of the Vampire, and the attempt was supervised by officials of the Royal Aero Club and conducted in accordance with the rules of the Federation Aeronautique Internationale. The illustration shows Major R. H. Mayo, the steward appointed to observe on behalf of the international authority, and Col. R. L. Preston.

It was two days before the National Physical Laboratory and Royal Aircraft Establishment were able to announce the new altitude record, still subject to official confirmation, of 18,133 m (59,492ft), following their examination of the special instruments employed and the relevant technical data.

The Ghost Vampire was entered for the record flight jointly by the de Havilland Aircraft Co., Ltd., and the Ministry of Supply, for whom it was produced. The de Havilland company will continue their high-altitude research programme for this aircraft, and it is possible that as a result of development the aircraft may later become capable of topping by a good margin the 60,000ft mark.

All the light alloy tubing used in

the construction of the Avro 'Athena'



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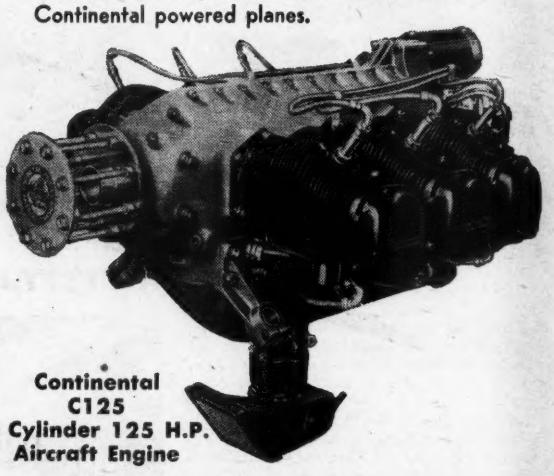

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CIVIL AVIATION

Flying a Dangerous and Extravagant Luxury

I WAS delighted to read the realistic fact-facing article by Robert Carling on civil aviation in the issue of March 18th.

In my opinion, in attempting to provide large-scale air transport we are trying to run before we can walk; we lack so many necessities and more important luxuries that to expend a large effort on flying is madness.

No human activity is without risk, but in view of the difficulties of navigation in bad weather, mechanical failures and errors in human judgment, my considered opinion is that flying is unsound in principle. When considered economically, in addition, it cannot appear anything but an extravagant activity. Undoubtedly there is a limited sphere of real usefulness, viz., conveyance of medical aid, rescue work, geological and photographic survey, etc.

If we must have flying, then let us concentrate on safer flying and not on bigger and faster aircraft with more and better cocktail bars and cinemas.

I suggest that the effort expended on civil air transport could be used more wisely on improving surface transport, growing food, building houses, or a thousand-and-one other more useful and more important activities. Let us have first things first. J. B. MATHESON.

Cheltenham, Glos.

BRITISH AIRLINERS

Give the Industry a Free Hand

IT is apparent that your correspondent, "Fact Facer" (*Flight*, March 25th) has completely missed the main points contained in my letter which appeared in your issue of February 19th.

I did not suggest that the particular aircraft referred to was, in the words of "Fact Facer," a world-beater. My point was that its withdrawal from service without evidence to show it to be unairworthy was, to say the least, a most regrettable decision. When similar instances have occurred in the past, there has always been, as far as I am aware, some technical fault with the aircraft before such action has been taken.

I agree that in many instances our civil aircraft are not up to scratch in certain refinements that are incorporated in American aircraft as a matter of course, but this does not necessarily imply that our designers are behind the times. Since the end of the war our aircraft industry appears to have been constantly hampered in the construction of civil aircraft by hordes of officials who have little or no idea of what is required. There is, of course, a notable exception to this, a firm only too well known for first-class aircraft, and who will not tolerate outside interference in their design. As indicated in my previous letter, I do not feel that matters will improve until such time as our industry is given a free hand to produce their aircraft in conjunction with the potential operator. Let the shackles be removed and I think that the aircraft we all wish to see will appear instead of remaining on the drawing board until they are out of date. DAVID G. THORPE.

Tunbridge Wells.

SAFE FLYING

It is up to the Clubs

THE time has come when we must clean up our ranks. Recent fatal crashes by light aircraft do not tend to make people airminded, and the disturbing factor is that all these crashes could have been avoided.

The chief offenders are pilots of the "show-off" type. They vary in experience from 10-1,000 hours, but they are all a menace to themselves and everyone else. Three recent crashes in which Auster aircraft have been involved will serve as examples:—

(1) Auster crashes in the sea off the Isle of Wight. Pilot and two passengers killed.

(2) Auster crashes at Northampton Aero Club. Pilot and passenger killed.

(3) Auster crashes at Tollerton, Notts. Pilot and passenger killed.

In all of these cases the pilots have, without doubt, been misusing their aircraft and paying no regard to flying regulations. The pilots have not only taken their own lives but in most cases the lives of others who very unwisely flew with them. Who is responsible? I am going to suggest that we club members are responsible. The solution is in our own hands. We must press for a keen safety committee in each club, with powers to suspend anyone for breach of flying regulations. Private owners would be controlled in the same way, by the committee making reports direct to M.C.A. of any breach of regulations. Until we, as club members, put our house in order I'm afraid that the responsibility for the loss of the lives of these "show-off" pilots, together with those of their unfortunate passengers, must rest on our shoulders.

Clay Lake, G. CLIFTON.
Spalding.

THE R.A.F.V.R.

Why Not a School at Barrow?

REFERRING to the recent correspondence on V.R. recruiting, I should like to take the opportunity of bringing to the notice of those it concerns, if possible, the forgotten land of the North-West.

From Scotland to Liverpool on this west coast we are devoid of all means of resuming our flying. We have no V.R. school, and for those who can afford it (and that rules out the writer for the time being) the nearest clubs are, I believe, at Carlisle to the north and Blackpool, or even Liverpool, to the south.

Why not a V.R. school at Barrow? We have an excellent airfield (now a sorry, vacant sight), and the position is central for the whole of the area.

I know that there are justifiable numbers of enthusiasts, and the A.T.C. squadrons in the area (there must be ten at least) who would welcome the opportunity to fly, if only occasionally. There is no flying whatsoever available now.

To those opposed to Tiger-bashing I would like to say "Get Airborne." The very simplicity of the Tiger is the test of skill, whether navigational, aerobatic or "instrumental." Tiger hours are not wasted hours. Too uncomfortable? What if the Wright Brothers, Blériot or our own Miss Johnson had said, "No! Too uncomfortable," or even the gallant Battle of Britain nucleus at the outbreak of war!

To those with the opportunity I say "Get Airborne," and get some hours in. Gladden your hearts with the joy of a sunny morning (?!) and the freedom of the skies.

With my heart in the skies and my head in book, this voice-in-the-wilderness, this fly-in-the-jam-pot, returns earthwards (flaps down, wheels down, mixture rich, fine pitch, — oh h—)—to swot!! "A BIRD IN A CAGE."

Barrow-in-Furness, Lancs.

FORTHCOMING EVENTS

Apr. 14th.—R.Ae.S. (Graduates and Students): "The Influence of the Recent Civil Airworthiness Requirements on Civil Aircraft Design." W. Tye, B.Sc., F.R.Ae.S.
Apr. 14th.—R.Ae.S. (Bristol): A.G.M. and Films.
Apr. 15th.—Royal Aeronautical Society: "Visual Aids for Low visibility Conditions," E. S. Calvert, B.Sc., A.R.C. Sc.I.
Apr. 16th.—British Interplanetary Society: "High Strength Hydrogen Peroxide for Rocket Propulsion." V. W. Slater, B.Sc., F.R.I.C., M.I.Chem.I. and W. S. Wood, B.Sc., F.R.I.C., A.M.I.Chem.E.
Apr. 16th.—Institute of Navigation: "The Future of the Magnetic Compass." Cdr. W. E. May, R.N.
Apr. 30th.—United Flying Clubs Ball, The Dorchester, Park Lane.
May 5th.—British Interplanetary Society: "Lunar Research." H. P. Wilkins, F.R.Ae.S.
May 8th.—R.Ae.S. (Glasgow): Visit to Prestwick Airport.
May 11th.—R.Ae.S. (Graduates and Students): "The Light Aeroplane and the Future of Private Flying." P.G. Masefield, M.A., F.R.Ae.S.
May 17th.—Cannes International Air Rally.
May 19th to 28th.—Engineering and Industrial Equipment (Home and Export) Exhibition.
May 21st.—Institute of Navigation: "Meteorology in Aviation: Is it Obsolete?" Francis Chichester.
May 22nd and 23rd.—Shannon Aero Club Rally.
May 24th to 29th.—Aircraft Exhibition Cardiff.
May 27th.—Royal Aeronautical Society: Wilbur Wright Memorial Lecture. A. Gouge, B.Sc., F.R.Ae.S.
May 29th and 30th.—Netherlands Aero Club Invitation Rally, Ypenburg, Holland.
May 29th and 30th.—Butlin's Week-end Air Rally. Speeton, Filey, Yorks.
June 5th.—Cardiff Air Display.
June 12th.—Wolverhampton Aero Club "At Home."

PRESENTATION: The scene at White Waltham on March 27th during the handing-over of a Slingsby T21 glider to the A.T.C.
"Flight" photograph.

Royal Air Force and Naval Aviation News and Announcements

SERVICE AVIATION

R. Aux. A. F. Appointment

THE Air Ministry announces the following Royal Auxiliary Air Force appointment:

S/L. Clive Bernard Barrett to command No. 2605 (County of Warwick) Light Anti-Aircraft Squadron, Royal Auxiliary Air Force Regiment, located at R.A.F. Honiley, Warwickshire.

Staff College and R.O.C. Commandants for U.S.A.

A.V-M. T. M. WILLIAMS, Commandant of the Royal Air Force Staff College, Bracknell, and A. Cdre. the Earl of Bandon, Commandant of the Royal Observer Corps, left England on March 28th on a three-week visit to the United States, to tour the American defence commands. At the invitation of General Spaatz, A.V-M. Williams will address the faculty and students of the United States Air University on "Air Strategy of the future as seen by the Royal Air Force."

The officers have also accepted an invitation to visit the Royal Canadian Air Force Headquarters and Staff College before returning to England.

Another Royal Air Force visitor to the United States Air University in April will be Air Chief Marshal Sir John Slessor, Commandant of the Imperial Defence College, who has been invited to speak on "A General Survey of the British Strategic Problem in the Post-war World."

A.O.C., Gibraltar

AIR COMMODORE RICHARD BOWEN JORDAN, C.B., D.F.C., formerly Air Officer Commanding, Royal Air Force Headquarters, Mauripur, has recently taken up a fresh appointment as A.O.C., Gibraltar. Air Commodore Jordan went to India in January, 1947, as A.O.C. No. 3 (Indian) Group and went to command Mauripur in the following August. Previously he was Director of Air Transport Policy and Operations at the Air Ministry, a post he took over a month after D-Day, and in this capacity he was concerned with the Air Ministry side of the planning of airborne operations, including the landing at Arnhem and the crossing of the Rhine, and later with the repatriation by air of thousands of troops from all over the world when the war ended. He was educated at Marlborough College and the Royal Air Force College, Cranwell, from which he was commissioned in December, 1922. During part of the war he commanded Polish and Canadian operational training units and he was also for a time attached to the U.S.A. Strategic Air Forces' Headquarters in the United Kingdom.

Planned Flying and Servicing

PLANS for a futurist type of hangar form part of a mobile exhibition, describing planned flying and servicing in the Royal Air Force, which is shortly to tour all R.A.F. headquarters and stations at home. It describes the various measures now being taken to achieve the most economical use of manpower and the maximum efficiency from resources. (See *Flight* of March 25th.)

Reunion

THERE will be a reunion dinner for ex-members of No. 230 Squadron, R.A.F., at Pimms Red House Restaurant, 94, Bishopsgate, E.C.2, on May 1st, 1948. Details from S/L. A. W. Deller, 0-26, Northwood Hall, Highgate, N.6.

Glider Presented to A.T.C.

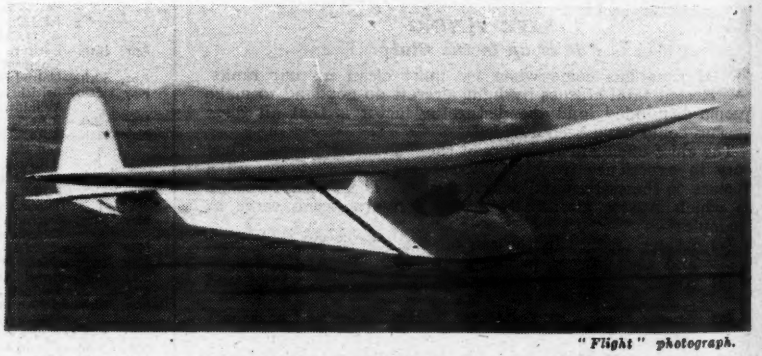
AS a result of the efforts over the past four years by Mrs. Heppell, of Maidenhead, to collect funds for the purpose, a new Slingsby T21 two-seater glider was on Saturday, March 27th, presented to the Air Ministry at White Waltham airfield.

The presentation was made by Mr. A. A. Benyon, His Majesty's Lieutenant for Berkshire, and was accepted by Air Marshal Sir Alan Lees, A.O.C.-in-C. Reserve Command, on behalf of the Air Ministry.

After Mrs. Heppell had named the glider *Venture*, it was handed over to F/L. J. A. West, who commands No. 123 Gliding School at White Waltham. On its first flight the passenger was Mr. W. F. Herbert, Chairman of the Berkshire A.T.C. Committee.

No. 153 (1st Berks), No. 1897 (Sunningdale), No. 3866 (Hungerford), No. 211 (Newbury) and No. 381 (Reading) squadron of the A.T.C. all contributed to the ceremony and aircraft of Reserve Command Communications Flight—three Ansons and a Spitfire—put up some excellent flying.

No. 123, which opened at Bray in 1942, was one of the first gliding schools to start. To date it has made over 18,000 launches, passed 234 cadets as proficient



"Flight" photograph.

TOUCH-DOWN: F/L West landing the Slingsby T21 "Venture", after its first flight at White Waltham.

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Service Aviation . . . . .

—182 of whom have obtained "A" certificates—and trained 24 instructors. In future it will operate from White Waltham.

R.A.A.F. News

A SCHEME for an active and comprehensive Reserve for the Royal Australian Air Force has been announced. This will embrace the following categories of personnel: (1) demobilized members of the R.A.A.F. still eligible for active service; (2) ex-permanent personnel who have completed their periods of engagement; (3) qualified aircrew and tradesmen from commercial aviation; (4) those who have completed their period on the active list with the Citizen Air Force; (5) officers whose short-service commissions have expired; and (6) ex-members of the R.A.A.F. Nursing Service, the W.A.A.A.F. and the Air Training Corps.

The permanent Air Force Reserve is planned to have between 5,000 and 8,000 members, based on the estimated requirements to bring peacetime squadrons to full war strength. The Citizen Air Force Reserve will consist of ex-members of the R.A.A.F. who served in the war, and who will be registered on application at their last substantive or temporary rank. In the Permanent R.A.A.F. Reserve the term of service is to be five years, with re-engagement for an additional five years.

No provision is made for the flying training of any section of the Reserve, but personnel would be kept in touch with developments by means of letters, bulletins, films, pamphlets and visits to Service stations to view new equipment and flying demonstrations.

It is further announced that the R.A.A.F. plans an extensive system of radar and radio aids. Installations costing £A1,250,000 will include G.C.A., and Service aircraft are to be fitted with SCS51—the standard American approach system. Radar beacons will be installed at fifteen points. Cathode-ray high-frequency direction-finding stations have been set up at coastal bases to facilitate search and rescue work, and high-powered weather transmitters are being installed at Canberra to link weather information with South Africa and Hawaii. A Loran chain is to be installed on the east coast of Australia to cover the eastern approaches, and radio-teleprinter stations will be established in all R.A.A.F. units.

Advice for Recruits

ROYAL AIR FORCE recruits are to be given a copy of a new booklet, "A Guide For Airmen on Joining the R.A.F.", designed to help them through the first weeks of Service life. The booklet explains service routine, draws attention to the regulations governing service life generally, tells the recruit about the amenities he may expect to find at his camp, and gives some useful hints about personal matters.

C.-in-C.'s Farewell to Japan

SOME of the tasks accomplished by the British Commonwealth Occupation Force are mentioned in a message to all ranks by the acting Commander-in-Chief, Air Vice-Marshal C. A. Bouchier, to mark the second anniversary of the arrival of the Force in Japan. The Air Vice-Marshal is now on his way to the U.K., and has said "goodbye" to the Command where he has served since February, 1946. In his message he recalls that during their stay in Japan, nearly 700,000 Japanese repatriates returned to their homeland through B.C.O.F. centres. Among the vast quantities of warlike stores destroyed were 75,000 tons of ammunition and explosives and 26,870 tons of poison gases.

The work of the Special Investigation Branch of the Provost Corps is described as having exercised influence by uncovering illicit trading by Japanese of supplies which should have been declared to the Government after the arrival of the Occupation Forces. The Provost courts continued to impress the Japanese by their everyday examples of scrupulous impartiality, by their integrity and fairness of British justice and the manner in which the sanctity of the personal rights of the common man is upheld.

"As we look back over the past two years to the bleak and desolate conditions which prevailed in the allotted British Commonwealth occupational areas from January, February and March, 1946 onwards, when our main forces arrived in Japan," he writes, "we can, I think, justifiably be proud of our achievements. Ruins and the darkest shadows of war once lay upon all the places we were required to occupy, and the tasks of rehabilitation seemed almost hopeless. Today, as we look around, it is difficult to realise what once was our lot. We see bomb-damaged sea walls repaired against inundation; roads and bridges made good and serviceable. New aerodrome runways have been built. Our camps and stations and airfields are now wholesome, clean and well-laid-out places, and there are trees and flowers where none grew before. Where necessary we have built schools and clubs and cinemas, messes and hospitals, and they are warm and friendly places."

At a farewell dinner party given in his honour at his Headquarters at Iwakuni before departing, he praised what he described as "the epic flight" in March, 1946, of 80 aircraft of No. 81 Fighter Wing of the Royal Australian Air Force from Borneo to Bofu over thousands of miles of sea in adverse weather conditions. He described this as one of the greatest feats in aviation history.

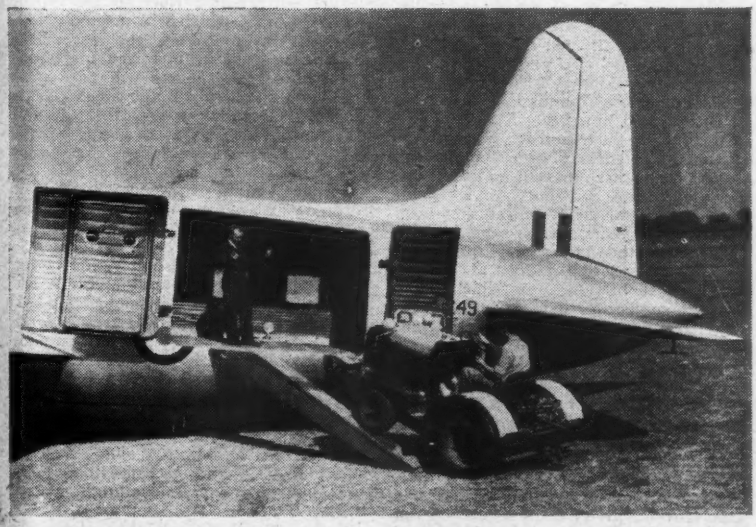
Ex-R.A.F. Officers—Wearing of Uniform

OFFICERS released from the Service who have been permitted to retain their rank may wear uniform at certain times. These occasions are when attending investitures, State ceremonies, parades in connection with the King's Birthday, ceremonies in connection with Remembrance Day or Battle of Britain Day, War Memorial Services and their own weddings. They may also wear uniform when inspecting or visiting units of the Reserve air forces or of the W.R.A.F., in an official capacity. At all other times, Air Ministry permission must be obtained beforehand. Officers of the rank of Wing Commander, or above, may wear appropriate uniform for ceremonial occasions at their discretion.

Mr. Churchill to Unveil Abbey Memorial

V.C.s of the two World Wars will be among representatives of the three Services who will attend the unveiling and dedication ceremony of a joint Services Memorial at Westminster Abbey on May 21st. The memorial will commemorate those who lost their lives in the Submarine Branch of the Royal Navy (1914-18 and 1939-45), the Airborne Forces (1939-45) and the Commandos (1939-45). It has been designed by Mr. Gilbert Ledward and will be unveiled by Mr. Winston Churchill, who will also give an address.

It is expected that about 2,000 people will be present in the Abbey, a maximum number of seats being allocated for next-of-kin, and the ceremony in the cloisters will be relayed by loudspeaker. Applications for tickets for admission to the Abbey should be made to:— Submarine Branch—Flag Officer Submarines (Abbey Memorial Service), Fort Blockhouse, Gosport, Hants; Airborne Forces



DAKOTA REPLACEMENT: The loading doors of the Vickers Valetta, now being introduced into the R.A.F. as a successor to the Douglas Dakota, are wide enough to admit a 25-pdr. gun, a jeep, ammunition tender or three-ton lorry.

HASTINGS DOWN UNDER: Having completed the 13,000 miles from Gt. Britain to Australia at an average speed in excess of 250 m.p.h. (49 hours' flying time), the Handley Page Hastings "TG 503" created deep interest among civil and military operators. The machine is seen at Mascot, Sydney. With Major Nicoll, Handley Page sales manager, is Mr. E. J. Williams, High Commissioner.

Service Aviation . . . . .

—The Controller, Airborne Forces Security Fund, Greenwich House, Newgate Street, London, E.C.1; Commandos —Combined Operations Headquarters, 1-3, Princes Gate, London, S.W.7.

Falcon Experiments

EXPERIMENTS with peregrine falcons to discourage birds from flocking on R.A.F. airfields have provided some useful information—sufficient to justify a continuation on a larger scale next autumn when the mating season is over. In 1947 there were 17 accidents to R.A.F. aircraft in Europe caused by impact with birds.

Summer Camp

NO. 615 (County of Surrey) squadron R.Aux.A.F. will hold its summer camp at Manston from August 14th to 28th. Last year they went to Horsham St. Faith, near Norwich.

The squadron is forming a gliding club in order that ground crews may have more opportunity to fly, and a B.A.C.7 two-seater is being built by members at Biggin Hill in their spare time.

Keenness to fill the few vacancies available in the squadron is such that there are 38 applicants for the four pilots required. It is expected that the squadron's town headquarters will be ready for use in July.

Sylt—Leave Centre

THE island of Sylt, the first German land target (a seaplane base) attacked by the R.A.F. in the late war, is to become a leave centre for service men and women stationed in Germany and Austria. The centre will be staffed and run by the R.A.F., but will be open to all the services, including members of the Control Commission and forces of the U.S.A. Most northerly of the Frisian Islands, Sylt, was until recently an R.A.F. armament training station. Its 25-mile coastline facing the North Sea has many excellent bathing beaches. Before the war it was a popular German summer resort. Several hotels at Westerland, the main town, have been requisitioned for housing people on leave, and altogether there will be accommodation for 400, including married families.

Sylt leave centre will be open only in the summer months. F/L. William J. Merrick, M.B.E., of Salford, Lancs, is to be in charge.

R.A.F. Supplementary Reserve

OVER 1,500 officers who served with the R.A.F. during the war are now enrolled on the Supplementary Lists of Officers opened a year ago. The total includes 66 W.A.A.F. officers. Applications continue to be received at a steady rate.

The Supplementary Lists are open to officers who served during the war and wish to maintain their connection with the Air Force, and are ready to volunteer for service if called upon in any future emergency. Officers enrolled do not undertake training during peace. Members of the Supplementary Lists are free to apply at any time to join the Royal Auxiliary Air Force or the R.A.F. Volunteer Reserve. Many officers have enrolled pending establishment of auxiliary or reserve training in their own areas.

Short Service Vacancies

SHORT Service Commissions have been introduced into the R.A.F. Technical branch as a temporary measure for officers on emergency commissions who are not more than 46. In addition, the upper age limit for short service commissions for emergency officers has been raised by ten years, to the same level of 46, for five other branches—Equipment, Secretarial, Catering, Physical Fitness and Provost branches—in which short service commissions have been available for some time. A few short service commissions are also offered to emergency officers with boat-building experience.

The Technical branch short service commissions are for five years' active list and four years' reserve service for emergency officers who are not ex-regular airmen with a gratuity at the rate of £100 a year for each year of active service. Those who are ex-regular airmen will serve on the active list for seven years or longer as necessary to qualify for retired pay. The officers with boat-building experience are needed for supervising marine craft repair work.

A.T.C. Annual Camps

SPRING and summer camps for Air Training Corps units throughout Great Britain, which will be held at 43 R.A.F. stations, began on April 3rd and will continue until mid-September. All the home Commands of the R.A.F. will be represented among the stations co-operating; the large camps will take 300 or more cadets, the smaller ones up to 100. Included with these will be seven camps to which gliding training schools will be attached, one in each Reserve Group area, including R.A.F. Northern Ireland. Gliding training facilities may also be given at the smaller camps when facilities permit.

Attendance at the camps is voluntary and will normally be for not more than seven days. Each party of 100 cadets will have at least two A.T.C. officers in charge. In addition, there will be an A.T.C. Camp Commandant and Camp Adjutant, together with a R.A.F. Liaison Officer. As many cadets as possible will be given flights in Service aircraft during their training, which will normally take place in the mornings, the rest of the day being spent in organized sports and recreation. The cadets will receive an extra milk and food allowance in addition to normal rations during camp.

The stations at which camps will be held are as follows: *No. 61 Group (Eastern Reserve) area,* R.A.F. Stations Thorney Island, Upwood, Stradishall, Wyton, Oakington, Waterbeach, Syerston, Tangmere, Wattisham. *No. 62 Group (Southern Reserve) area,* R.A.F. Stations St. Eval, Calshot, Aston Down, Mount Batten, Hullavington, Little Rissington, Locking, Chivenor. *No. 63 Group (W. and Welsh Reserve) area,* R.A.F. Stations Valley, St. Athan, Cosford, Woodvale, Pembrey. *No. 64 Group (Northern Reserve) area,* R.A.F. Stations Dishforth, Binbrook, Leeming, Linton-on-Ouse, Leconfield, Manby, Driffield, Cottesmore, Cranwell, Wittering, Church Fenton. *No. 65 Group (London Reserve) area,* R.A.F. Stations Manston, Felixstowe, Odiham, West Malling. *No. 66 Group (Scottish Reserve) area,* R.A.F. Stations Turnhouse, Kinloss, Leuchars, Montrose, West Freugh. *R.A.F. Northern Ireland,* R.A.F. Station, Wig Bay.

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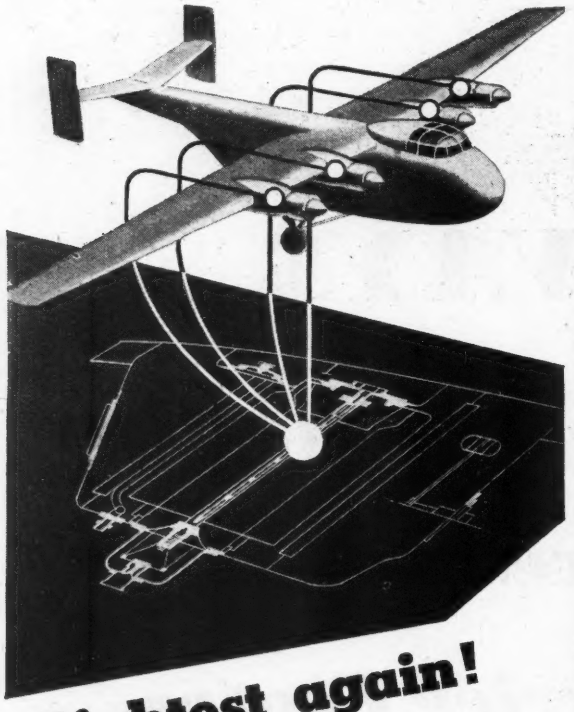

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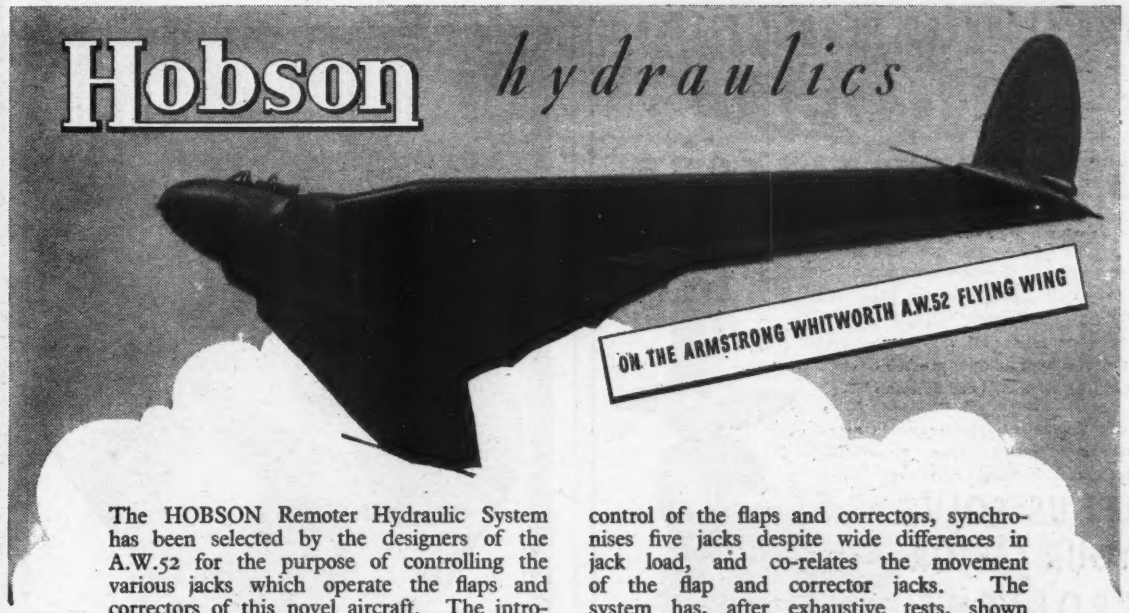

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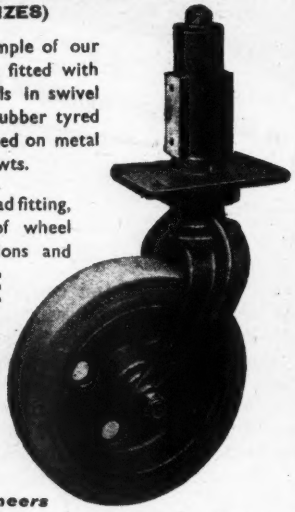

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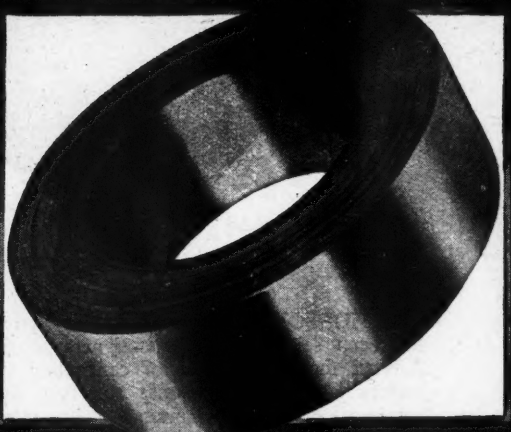

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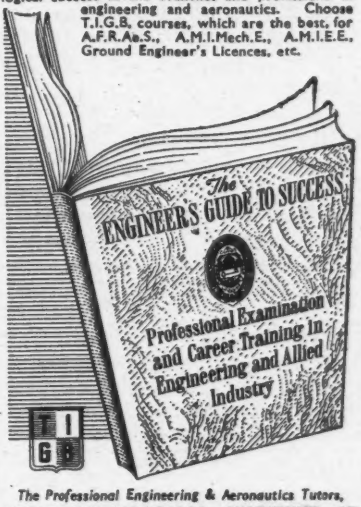
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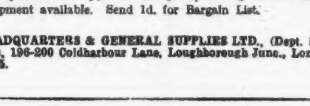

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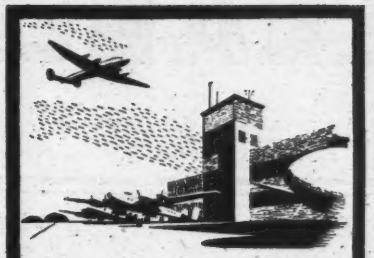

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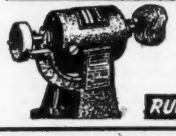

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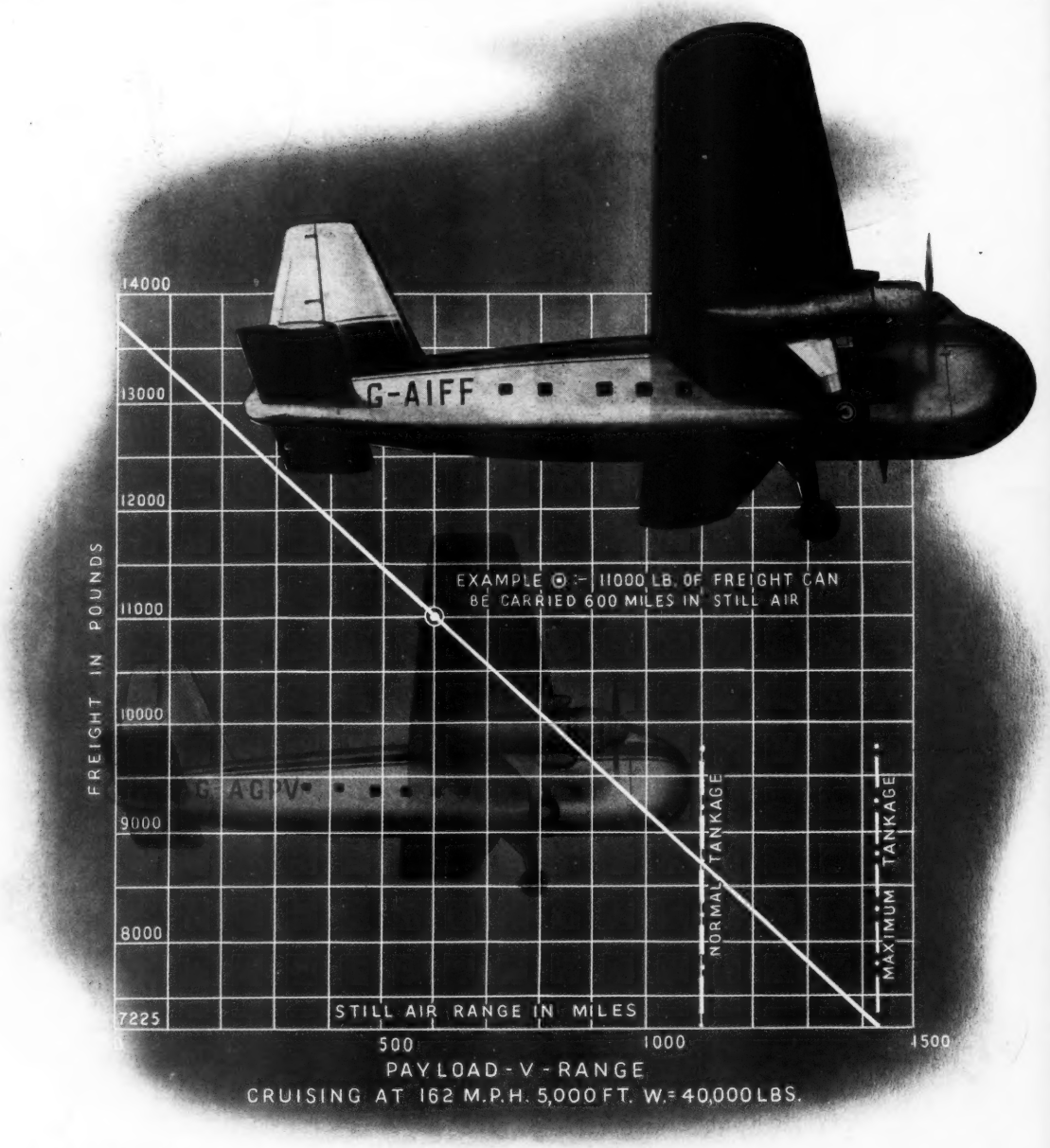

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